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Published by Database Publications Ltd
Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.
Telephone: 061-456 8835 (Editorial) 061-456 8383 (Administration) 061-456 8500 (Advertising)
Subscriptions: 061-480 0171. Telecom Gold Mailbox: 72:MAG001. Prestel: 814568383.
Telex: 265871 MONREF G, Quoting Ref. 72:MAG001.

ABC 26,435 January-June 1985

News trade distribution:
Europress Sales and Distribution Limited, Unit 1, Burgess Road, Ivyhouse Lane, Hastings, East Sussex TN35 4NR. Tel: 0424 430422.

Electron User is an independent publication. Acorn Computers Ltd, manufacturers of the Electron, are not responsible for any of the articles in this issue or for any of the opinions expressed.

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Subscription rates for 12 issues, post free:
£12 UK & Eire (Sterling only)
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Get to grips with your micro with the help of the superb, easy to read series for beginners featured in *Electron User*. By the time you've read the first nine articles from Volume 1, you'll know so much more about how your Electron works.

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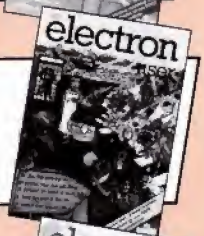

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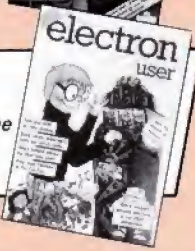

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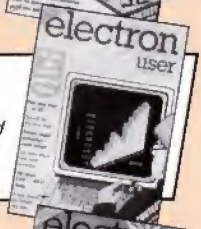

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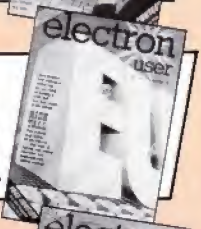

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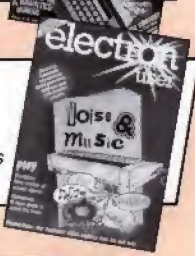

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electron user NEWS

ELECTRON USER ADVT PACKS A PUNCH

A MONTH-long ban on advertising has been slapped on an Electron product – because it was too successful.

Ray Hope and his partner Anthony Adams of Morley Electronics are just two who have found the expansion in the Electron market bigger than expected.

Ray, based at Wallsend, Newcastle-upon-Tyne, took out a full page advert in February's *Electron User* for his £149.95 Teletext Adapter for the Electron.

He said: "We estimated we could handle about 25 orders a month for it, but on the first day we advertised we reached our maximum quota.

"We had one order for the entire 25 adapters from a local education authority. It surprised us that the Electron was so popular in schools. We thought the BBC was top of the market but everyone seem to like our built-in Mode 7".

Although only set up three years ago, Morely Electronics is already considering increasing its staff of six.

Electron boom creates more jobs

MORE than 100 extra jobs have been created in the wake of the continuing surge of sales for the Electron market.

They have been caused because many companies are stretched to the limit trying to cope with demands for add-ons and software.

Voltmace, in Herts, has recruited seven more workers to complete its order book.

Director Tony Pearmain, said: "We needed them because of our success with Delta 3B twin joysticks. We are now selling four times as many for the Electron than the BBC, our main market".

His main order – 10,000 – is for Currys who are offering an Electron package.

All over Britain there were similar reports of companies contemplating staff expansion because of the steady orders.

Ray Threadgould, a director of First Byte Computers, in Derby, said: "The Dixon deal with the Electron machines has meant a steady market.

"We have sold 23,000 joystick interfaces in the past two years, and our printer interface is also in demand as Electron users upgrade".

Adrian Kearney, a director of Slogger, predicted "a very active year with Electrons being sold cheaply, so creating a market for extra equipment".

Superior Software boss Rick Hanson said: "We are very optimistic about sales – prices are being held, and the improved quality in the goods offered will mean a better share for the Electron market".

Mike O'Leary, director of Robico Software claimed many shops are stocking Electron software in preference to BBC.

New products for the Show

MORE than half the exhibitors at this month's Electron & BBC Micro User Show will be launching or demonstrating entirely new hardware and software.

A survey carried out by *Electron User* has revealed that at least 30 of the 50 plus leading firms which have booked stands intend to reveal new products.

The show, which takes place at the Royal Horticultural Hall, London SW1, on May 16, 17 and 18, has attracted all the famous names familiar to Electron enthusiasts.

Organiser Database Exhibitions says the speed at which stands and advance tickets have been snapped up indicates the show is on target to break all previous records.

Interest has been particularly stimulated by the massive increase in the Electron user base caused by bumper sales of the machine over the Christmas period.

This means the Electron will in no way be overshadowed by its big brothers at Acorn – even the new generation of BBC products, the Master 128 and Master Turbo Upgrade, which are among the highlights of the show.

There will be no shortage of new software and peripherals, and bargains galore from exhibitors keen to clear their shelves to make space for the new items coming on to the market.

Significantly a major share of new Electron products are aimed at the serious micro user, proof of just how far the machine has come in the past year.

Communications, disc drives, languages and ROM expansion boxes have given the Electron a new image far removed from that of a games machine, and products at the show reflect this fully.

For instance Advanced Computer Products will have its AP4 disc interface for the Electron on sale for the first time.

Fully Acorn-compatible and running 1770 DFS at £00, it

Turn to Page 7

ELECTRON & BBC MICRO USER SHOW

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Hauser joins Olivetti

HERMANN Hauser, one of the co-founders of Acorn, has been appointed director of advanced research and development in the Olivetti Group.

The move is seen as a compliment to 38-year-old Dr Hauser who helped found Acorn in 1981 and has always been in charge of research.

He was chairman of Acorn up to March when Olivetti took up 49.3 per cent of the company's shares, increasing that to 79.8 per cent six months later.

Dr Hauser, who has about a 7 per cent holding in the company, will remain a non-executive director of Acorn and will continue to contribute to Acorn research and development.

It is expected that he will eventually move from Cambridge to the Olivetti headquarters in Ivrea, Italy.

SCHOOL PLUMPS FOR MOBILE ELECTRONS

PROOF that the Electron can more than hold its own in the BBC-dominated education field comes from Tuxford Comprehensive School, Newark, Nottinghamshire.

Although the school has a computer department equipped with BBC Micros paid for by the County Council, it has used its own money to buy Electrons.

These are being used to teach mathematics and English and have an advantage over the BBC machines in that they are mounted on trolleys and can be easily moved around the school from classroom to classroom.

Because no funding was available from the County Council, the school had to raise £2,500 for its four Electrons, Cumana disc drives and other equipment.

Local industry contributed £1,100 and the rest came from profits from a school "shop" selling stationery supplies.

Electrons in use at Tuxford Comprehensive School

The decision to buy Electrons instead of more BBCs was partly influenced by the price differential, but Tuxford's head of mathematics, Oliver Foreman, says: "It certainly seems the right choice was made.

"With PAGE the same as with the tape system – unlike the BBC DFS – tape to disc transfer is easy, the instructions in the handbook working with all but the most protracted software.

"The conversion utility allows programs to be used with the Electrons as well as the computer department's BBCs.

"And with room for 90 files on the Cumana discs we are three times better off than the BBC DFS, although loading and saving is not as fast as Plus 3 or DFS".

An additional spin-off for the school has been the setting up of its own software house, Toxsoft, a cooperative of four teachers and computer-literate sixth formers.

So far six mathematics teaching programs for children between the ages of eight and 13 have been produced and marketed commercially.

And Tuxsoft has just launched an English teaching program for the same age group covering spelling and word recognition and offering several levels of difficulty.

The programs have been welcomed by educationalists but, says Oliver Foreman, "unfortunately they haven't as yet made us any money.

"The sixth formers get a set hourly rate for their work for Tuxsoft, but our plans for paying them a profit sharing bonus will have to be shelved until we start to make money.

"However we are hoping our English program will mark a turning point in the fortunes of Tuxsoft and put us into the black at last".

LINING UP FOR THE BIG SHOW..

From Page 5

provides the Electron with features shared by the BBC B Plus and Master series.

It enables more taped software to be run from disc, does not use up any of the RAM inside the machine, and allows the user to access compatible BBC disc-based software. Price is £69.55.

Also new from ACP is advanced disc investigator ADI, a powerful disc utility ROM for standard and non-standard discs that will work with DFS or ADFS. Supplied on 16k eprom with full documentation it costs £25.

Slogger is hoping to launch its new database upgrade on ROM – Starstore II – at the show, along with two new hardware products for the Electron and "special prices on all our products".

Gemini Marketing will be selling the Electron version of its Office Mate software. This database, graphics, spreadsheet and home accounts package comes on cassette with instructions for putting on disc and costs £12.

On the education scene LCL Software is bringing out an improved version of Micro English, a 24 program course for beginners up to O level that comes on two discs and a cassette and costs £24. Another exhibitor, Wigmore House, is offering its Trackball and MousePaint graphics package at a special discount.

Vine Micros is introducing its latest ROM for the Electron. The Matrix ROM for engineers, mathematicians and scientists uses Basic commands in performing matrix operations and solving linear simultaneous equations.

The company is also offering a discount on Addcomm, its toolkit graphics ROM for the Electron.

Shards Software is selling its adventure games and educational software at discount prices, with a "very special deal" on their Woodbury End.

New for the Electron on cassette and disc from CDS are Steve Davis Snooker and golf simulation Birdie Barrage.

Blue Ribbon will have its new Games Disc I containing five titles – Castle Assault, Astro Plumber, Diamond Mine I and II, and Nightmare Maze – on disc and cassette. It will also be offering "special priced" 3½ and 5¼in Electron blank discs.

Loony Loco from Kansas City Systems is a cowboy-style chase involving four separate games on cassette. The company is also offering a new, sophisticated adventure called The Ferryman Awakes.

Boost from Boots

BRITISH Educational Software Associates and 20 main branches of Boots have joined forces to promote home learning software.

Special educational software display units have been installed at Boots stores from Aberdeen to the Isle of Wight featuring programs produced by BESA members for the Electron and other micros.

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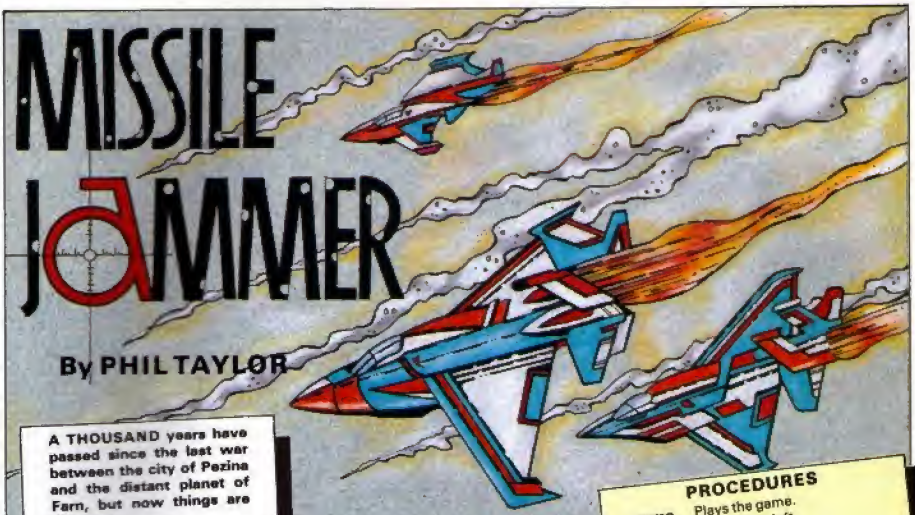
MISSILE JAMMER

By PHIL TAYLOR



A THOUSAND years have passed since the last war between the city of Pezina and the distant planet of Farn, but now things are different.

The Farnites had found a document saying that the Pezinas had done a great injustice to them thousands of years ago.

The Pezinas knew this document was false as they are a friendly and democratic nation. War was then declared by the Farnites.

Because the Pezinas were a peaceful race their planet was battered until only the capital city remained. In a last desperate attempt to save their city they have called you in.

You are a famous pilot, once a member of the Galactic Space Federation, but now you hire out to anyone in need.

You have chosen your ship the Xenon for this mission. It is a high powered ramming craft specially designed to knock out incoming missiles.

You have no easy task, as the Farnites are sending missiles one after the other.

If you continue to stop their missiles the Farnites will start to send them in at different angles.

Your Xenon craft uses thousands of litres of fuel which needs to be replaced regularly by calling on the refuelling vessel on tha right of the screen.

To control your ship use Z to move left and X to move right.

VARIABLES

HI%	Hi-score.
G%	Horizontal position of ship.
L%	Number of lives.
F%	Fuel.
SC%	Score.
C$	Fuelling vessel.
B$	Explosion.
A$	Ship.
S,Y	Coordinates of missile.

PROCEDURES

game	Plays the game.
left	Moves ship left.
right	Moves ship right.
surface	Draws city.
init	Defines graphics and variables.
setup	Draws screen.
fall	Moves missile down.
fall2	Moves missile right and down.
check	Checks if ship hit missile.
losefuel	Decreases amount of fuel.
instr	Displays instruction page.

Full listing starts on Page 10

Missile Jammer listing

From Page 9

```
  10 REM Missile Jammer
  20 REM By P.Taylor
  30 REM (c) Electron User
  40 HIMEM=&3000:*FX16
  50 Z=1:HI%=100
  60 DEFPROCstart
  70 IF Z=1 VDU22,4:VDU19,
1,3;0;:PROCinstr
  80 Z=0:VDU 22,2
  90 PROCinit
 100 PROCsetup
 110 PROCgame
 120 MODE 6:END
 130 DEFPROCgame
 140 COLOUR 5
 150 TIME=0
 160 IFINKEY(-67)AND6%(14P
ROCright
 170 IF D%=2 PROCfall2 ELS
E PROCfall
 180 IF6%=14SOUND1,-15,1,3
:PROCclosefuel
 190 IFINKEY(-98)AND6%>1PR
OCleft
 200 IFRND(15)=2PROCclosefu
el
 210 GOTO 160
 220 ENDPROC
 230 DEFPROCleft
 240 6%=6%-1:SOUND1,-15,1,
1:PRINTTAB(6%,24);A$:ENDPRO
C
 250 DEFPROCright
 260 6%=6%+1:SOUND1,-15,22
4,1:PRINTTAB(6%,24);A$:ENDP
ROC
 270 DEFPROCsurface
 280 GCOL0,2:MOVE 50,100:M
OVE 640,30:PLOT 85,1230,100
:MOVE 100,100:MOVE 800,100:
PLOT 85,500,20
 290 MOVE 1100,100:MOVE 48
0,100:PLOT 85,740,20:PLOT 8
5,200,100
 300 FOR I%=50 TO 1230 STE
P 8:GCOL 0,RND(7):MOVE I%,1
00:DRAW I%,RND(70)+100:NEXT
 310 ENDPROC
 320 DEFPROCplanet(X1%,Y1%
,R%,C%)
 330 LOCAL Y%
 340 PROCcircle(X1%,Y1%,R%
,C%)
 350 GCOL 0,6
 360 FOR Y%=Y1%-R% TO Y1%
+R% STEP 4:PLOT 77,X1%,Y%:
NEXT
 370 ENDPROC
 380 DEFPROCcircle(X1%,Y1%
,R%,C%)
 390 MOVE X1%+R%,Y%:GCOL 0
,C%:FOR A%=-150 TO 70 STEP
10:DRAW X1%-R%*COS(RAD(A%))
,Y1%+R%*SIN(RAD(A%)):NEXT
 400 ENDPROC
 410 DEFPROCinit
 420 VDU 23,1,0;0;0;0;
 430 VDU 23,224,62,62,28,2
8,28,28,8,8
 440 VDU 23,225,126,153,15
3,24,60,126,126,24
 450 VDU 23,226,60,102,66,
102,60,60,219,129
 460 VDU23,227,8,12,6,2,3,
224,56,14
 470 VDU23,228,8,8,8,8,8,136
,200,73,8
 480 VDU23,229,4,12,24,112
,64,193,143,56
 490 VDU23,230,2,8,240,30,
8,8,254,8
 500 VDU23,232,96,8,15,120
,8,8,127,8
 510 VDU23,233,8,8,8,7,7,2
55,7,7
 520 VDU23,234,8,8,31,156,
252,255,252,252
 530 VDU23,235,8,8,254,14,
14,254,31,31
 540 VDU23,236,255,7,7,8,8
,8,8,8
 550 VDU23,237,252,252,156
,31,2,15,8,8
 560 VDU23,238,254,254,254
,254,4,159,8,8
 570 VDU23,239,48,112,248,
248,28,14,6,1
 580 6%=4
 590 A=1
 600 LI=3
 610 F%=99
 620 D%=1
 630 SC%=0
 640 C$=CHR$(233)+CHR$(234
)+CHR$(235)+CHR$(10)+CHR$(8
)+CHR$(8)+CHR$(8)+CHR$(236)
+CHR$(237)+CHR$(238)
 650 B$=CHR$(227)+CHR$(228
)+CHR$(229)+CHR$(10)+CHR$(8
)+CHR$(232)+CHR$(8)+CHR$(8)
+CHR$(8)+CHR$(230)
 660 A$=" "+CHR$(225)+" "+
CHR$(8)+CHR$(8)+CHR$(10)+CH
R$(8)+" "+CHR$(226)+" "+CHR
$(8)+CHR$(8)+CHR$(11)
 670 S=RND(12)+1:Y=9
 680 ENDPROC
 690 DEFPROCsetup
 700 GCOL 0,7:FOR STAR%=1
TO 100:PLOT 69,RND(1280),RN
D(1024):NEXT
 710 PROCfuel
 720 GCOL 0,0:MOVE 1280,10
24:MOVE 1280,700:PLOT 85,90
0,1024:PLOT 85,900,700
 730 COLOUR 4:PRINTTAB(17,
23);C$
 740 PROCsurface
 750 PROCplanet(1100,900,2
00,2)
 760 GCOL 0,7:MOVE 0,0:DRA
W 1276,0:DRAW 1276,1020:DRA
W 0,1020:DRAW 0,0
 770 COLOUR 5:PRINTTAB(6%,
24);A$
 780 PRINTTAB(6,14);"READY
!":PROCpa:COLOUR 0:PRINTTAB
(6,14);"READY!"
 790 ENDPROC
 800 DEFPROCfall
 810 COLOUR 7
 820 IF Y%23 PROCdelete
 830 PRINTTAB(S,Y%);CHR$(22
4);TAB(S,Y%-1)" "
 840 Y=Y%+1
 850 COLOUR 5
 860 ENDPROC
 870 DEFPROCfall2
 880 IF A=0 THEN A=1:ENDPR
OC
 890 COLOUR 7
 900 IF Y%23 PROCdelete
 910 PRINTTAB(S,Y%);CHR$(23
9)
 920 IF S=2 PRINTTAB(S,Y-1
);" "
 930 PRINTTAB(S-1,Y-1);" "
 940 Y=Y%+1:S=S+1
 950 COLOUR 5
 960 A=0
 970 ENDPROC
 980 DEFPROCdelete
 990 PRINTTAB(S-2,23)"  "
1000 PROCcheck
1010 IF D%=1 THEN Y=RND(14
)+1:S=RND(12)+1 ELSE Y=RND(
12)+9:S=2
1020 IF D%=1 IF S<9 AND Y<
=5 GOTO 1010
1030 ENDPROC
1040 DEFPROCcheck
1050 IF D%=1 GOTO 1010
1060 IF 6%+1=S OR 6%+2=S G
OTO 1070 ELSE PROCdead
1070 COLOUR 3:PRINTTAB(6%,
23);B$:SOUND 0,-15,6,6
1080 PROCP
1090 COLOUR 0:PRINTTAB(6%,
23);B$:SC%=SC%+10:GCOL 0,7:
MOVE 0,100:DRAW 0,300
1100 IF SC%=200 PROClevel
1110 COLOUR 5
1120 ENDPROC
1130 DEFPROCdead
1140 LI%=LI%-1:IF LI%=0 THEN
PROCend
1150 F%=99
1160 IF LI%=2 PRINTTAB(3,14
);"THAT'S 1 DOWN":PROCpa:CO
LOUR 0:PRINTTAB(3,14);"THAT
'S 1 DOWN":PROCfuel:COLOUR
5:ENDPROC:ELSE PRINTTAB(3,1
4);"THAT'S 2 DOWN":PROCpa:C
OLOUR 0:PRINTTAB(3,14);"THA
T'S 2 DOWN":PROCfuel:COLOUR
5:ENDPROC
1170 DEFPROCfuel
1180 MOVE 50,1000:MOVE 500
,1000:GCOL 0,7:PLOT 85,50,9
00:PLOT 85,500,900:GCOL 0,1
:MOVE 70,980:MOVE 520,980:P
LOT 85,70,880:PLOT 85,520,8
80
1190 COLOUR129:COLOUR4:PRI
NTTAB(1,2);"FUEL=";F%:PRINT
TAB(1,3);"______"
1200 COLOUR128
1210 ENDPROC
1220 DEFPROCclosefuel:COLOU
R129:COLOUR4:PRINTTAB(6,2);
"  ";F%=F%-RND(8):PRINTTAB(
6,2);F%:COLOUR128:COLOUR5:I
FF%<0PROCdead
1230 ENDPROC
1240 DEFPROCend
1250 FOR I=1 TO 7:VDU 19,1
,I+7;0;:NEXT
1260 *FX9,2
1270 *FX18,2
1280 FORD=1 TO 100:SOUND &
10,-15,RND(8),1:NEXT
1290 CLS
1300 VDU 22,4:VDU 19,1,1;0
;
1310 VDU 23,1,0;0;0;0;
1320 COLOUR 1:CLS
1330 PROCtitle
1340 *FX11,0
1350 PRINTTAB(3,5);"WELL D
ONE !!!!"
1360 PRINT''"YOU PROTECTED
YOUR CITY FOR ";TIME DIV 10
0;" SECS."
```

```
1370 PRINT"SAVING ";(TIME
 DIV 100)*219;" PEOPLE."
1380 IF SCI>HI% THEN HI%=S
CI
1390 PRINT"PLAYER 1 SCORE
 = ";SCI;:PRINT" HI-SCORE =
 ";HI%
1400 PRINT'"THE PEOPLE OF
 PEZINA HONOR YOU AS A"'"H
ERO. THEY APPOINT YOU CHIEF
 OF DEFENCE."'"GO FORTH, D
EFEND THY PEOPLE FROM THE"'
"EVIL OF THE UNIVERSE...."
'"  I, YOUR TRUSTY COMPUTE
R WISH YOU LUCK"
1410 PRINT'"  Press SPACE
BAR to play again....":OSCL
I"FX21":REPEAT:G$=GET$:UNTI
L G$=" "
1420 PROCstart
1430 ENDPROC
1440 DEFPROCtitle
1450 PRINTTAB(12,1);"MISSI
LE JAMMER"
1460 PRINTTAB(12,2);"******
**********
1470 ENDPROC
1480 DEFPROCinstr
1490 CLS
1500 COLOUR 1
1510 VDU 23,1,0;0;0;0;
1520 PROCtitle
1530 PRINT" This game is a
 challange of skill for  1
player. You must destroy in
coming     missiles with yo
ur ship before they     rea
ch your home planet."
1540 PRINT'" You are armed
 only with your ranger   c
raft the 'XENON'. You must
ran the     missiles with t
he top of your spaceship."
1550 PRINT'" BEWARE if 3 m
issile get past, the     p
lanet will be destroyed."
1560 PRINT'" Fuel must be
kept up at all times. To  r
efuel simply travel to the
refueling   vessel to the r
ight of the screen."
1570 PRINT'"CONTROLS:-"
1580 PRINT'"      Z  -  LE
FT     X  -  RIGHT"
1590 PRINT'" Will you surv
ive the first wave of     m
issiles ? If so the second
are even     more deadly."
1600 PRINT'"      YOU HAVE
 BEEN WARNED !!!"
1610 PRINT'"     Press SPA
CE BAR to continue":REPEAT:
G$=GET$:UNTIL G$=" "
1620 ENDPROC
1630 DEFPROCP:FOR P=1 TO 3
0:NEXT:ENDPROC
1640 DEFPROClevel
1650 DI=2
1660 COLOUR 7
1670 VDU 28,4,19,14,16
1680 RESTORE 1780
1690 FOR I=1 TO 26
1700 READ L$:COLOUR RND(6)
+1
1710 V=RND(2)-1:IF V=1 THE
N V=5 ELSE V=3
1720 PRINT L$;:BOUND1,-15,
230,V
1730 FORD=1 TO 150:NEXT
1740 NEXT
1750 SCI=SCI+400
1760 FORPI=1 TO 5000:NEXT:
CLS:VDU 28,0,31,19,0
1770 PRINTTAB(6,14);"READY
!";:PROCpa:COLOUR 0:PRINTTAB
(6,14);"READY!"
1780 DATA F,1,R,S,T," ",W,
A,V,E," ",C,O,M,P,L,E,T,E,
"    ",B,O,N,U,S,!
1790 ENDPROC
1800 DEFPROCpa:FORP=1 TO 2
000:NEXT:ENDPROC
1810 IF GX+1=S GOTO 1070 E
LSE PROCdead:GOTO 1110
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

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Program: Steve Davis Snooker
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Snooker the chips

IN this game you have the chance to play a few frames of snooker against Steve Davis. True, he doesn't actually appear in your living room, but even so he can play with real class and skill.

The rules of snooker are faithfully followed in this implementation, with numerous options available to players.

You can challenge another person or the computer – which calls itself S. Davis. You can give the computer skill levels between 1 (worse than me) and 9 (world champion). You can set the table speed at the start of the game to fast, medium or slow.

The computer also recognises a foul shot and gives the option of passing play back to your opponent.

The direction of your shot is controlled by moving a cross to the desired position. The control keys are then used to select the required spin and the power of the shot.

The keys are easy to use and options are soon learned.

The movement of the balls is a little erratic. The cue ball may struggle to reach its target then suddenly speed away.

It is a pity that the game is silent as it would have more atmosphere with the clunk of cue on ball.

As with all snooker games there is a problem with the colours. The table is black in this version, which means that the black ball appears as a white ring. The brown ball is red and green mixed together.

This is an adequate snooker game. Its outstanding merit is

its ability to allow the computer to be your opponent. This feature gives it a lead over other versions and makes it good value at £8.95.

Rog Frost

Sound	0
Graphics	8
Playability	8
Value for money	8
Overall	7

Program: Karate Combat
Price: £9.95.
Supplier: Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX. Tel: 0532 459453

Game has a kick

MARTIAL arts games certainly seem to be popular at the moment, with Karate Combat from Superior Software adding to the available range on this theme.

The game follows the usual format, with the scene set against an oriental backdrop and the two players awaiting combat on the floor area. The referee sits on the sidelines, ready to issue commands and keep track of the scores.

The game provides three options – practise, single player and two players. Practise mode gives you the opportunity to knock spots off a stationary punchbag. In this mode it is possible to practise all the available moves – and there are quite a few – without the worry of being smashed to the ground by your opponent.

The single player option lets you play against a computer controlled opponent. To see your opponent jumping, rolling, punching and kicking with extraordinary speed and dexterity is enough to send you scurrying back to the practise mode.

The third option allows two players to compete against each other, which probably gives you more of a fair chance than playing against the computer.

There are 16 different opponents, and each victory gives you a crack at a new one. If you manage to beat the final opponent, known as The Master, you can enter a draw to win £100 and a trophy.

The game may be played with either keyboard or joysticks, but using the keyboard is quite tricky due to the number of keys used to cover all the available moves. Joysticks are a much easier option.

The graphics are colourful, smooth and flicker-free. Sound effects are also provided, with the option to toggle these on or off.

I can't get very excited about these martial arts games, but nevertheless this version is as good as any I have seen.

Geoff Turner

Sound	7
Graphics	7
Playability	9
Value for Money	8
Overall	8

Program: Star Drifter
Price: £3.95
Supplier: Firebird, Wellington House, Upper St. Martin's Lane, London WC2H 9DL. Tel: 01-379 6755

Mystery starship

THE first thing that strikes you about Star Drifter is the sophisticated loader complete with twinkling stars.

The game allows you to define the keys you wish to use to move around, fire and pick up or drop objects. Other options include sound on or off to spare the rest of the family, and freeze/restart, which I always find useful to rest my aching fingers.

This is the latest in the current vogue for graphics adventures. Set in a maze of passages on board an ancient starship, your task is to uncover the mystery surrounding the disappearance of the other members of the fleet. The walls of the passages are covered with strange equipment and messages, not unlike Egyptian hieroglyphics.

You soon find that you are not the only creature on board the ship, which is filled with a variety of small, colourful and deadly alien lifeforms, each of which will try to rob you of your vital oxygen supply. When you've picked up the gun you can gain points for zapping them as you travel round the ship.

The graphics are nicely done, as good on a colour TV as a black and white one. The spaceman moves fast and smooth, though it must be said he slows somewhat when the screen is full of agitated aliens.

Some of the passages are blocked by walls which can be blasted, and others by force fields which repel you unless you are carrying the correct two keys.

Only three objects at a time can be carried, and the instructions suggest that you should start by returning the radio to the bridge to enable communication with Earth.

The limiting factors are three lives and the oxygen supply, so to solve this game you'll have to keep very busy.

Star Drifter needs more

thought than most space action games, and it should help bridge the gap between these and text adventures.

All in all I quite liked it, even if I didn't get very far. It's well written and the package has been well produced.

Nick Rhodes

Sound	4
Graphics	8
Playability	7
Value for money	8
Overall	7

Program: Gyroscope
Price: £8.95
Supplier: Melbourne House, 60 High Street, Hampton Wick, Kingston-upon-Thames, Surrey KT1 4DB. Tel: 01-943 3911

Dizzy descent

THE scenario in this arcade style game is of a gyroscope, spinning and falling down hills. You control it using the usual four keys for left, right, up and down. Your aim is to steer it along narrow causeways and into a little hole.

This may sound easy, but most of the slopes are on a diagonal course with precipitous hair-pin bends, which require skilful handling of the control keys.

Magnets are strewn about the place to make your task more complex. These turn your gyroscope into a whirling dervish, flying hither and thither like a ball on a pin table.

As if this weren't enough, there are also aliens, hell-bent on knocking the gyroscope over. They take the form of arm-waving ghosts, sidewinder snakes, rival gyroscopes and fried eggs.

If the gyroscope falls off a path, or is knocked over, you lose one of your seven lives.

To complete the game you must master four routes, each consisting of three screens which scroll vertically. The instructions promise a surprise when the game is completed, but I've only mastered three routes so far.

The graphics are of a very good quality, with pleasing use of colour, except for an unnecessary flashing at the start.

Sadly, a couple of problems spoil what could be a very good game. Sometimes, a magnet captures the gyroscope and the game seems to freeze, whilst emitting an irritating noise. It is also possible for an alien to be at the spot where the gyroscope re-starts after falling over, which means all seven lives can be lost. Such bugs ought not to appear in software priced at £8.95.

Rog Frost

Sound	5
Graphics	6
Playability	6
Value for Money	4
Overall	5

Program: Southern Belle
Price: £7.95
Supplier: Hewson, 56B Milton Trading Estate, Milton, Abingdon OX14 4RX. Tel: 0235 832939

The lure of steam

WHEN steam locomotives were popular many schoolboys had ambitions of becoming engine drivers. Even adults who were not steam engine fanatics often dreamed of taking control of a real train.

Now, with Southern Belle, you can re-live those days and try your hand at being a steam engine driver in the comfort of your home.

The ultimate aim is to travel from London to Brighton taking your place on the footplate of this King Arthur class locomotive. A menu has seven options, including a demonstration run, various practice options and a problem run.

The demonstration run automatically engages after a minute and you would be well advised to watch this. It gives you an idea of the features and terrain that you are going to meet.

A leaflet explaining the principles of steam locomotion is included in the package.

The demonstration over, you should spend some time on the training run.

When you have mastered the training, and it will take a while, you can move on to more challenging schedules such as the record breaking run, set on July 26, 1903 at 48 minutes 41 seconds.

You must keep to speed regulations and be careful not to derail when going round bends – a regular occurrence in my attempts.

The screen is built round a central window containing a 3D graphic representation of the track, surrounding countryside, and the footplate.

The information display includes a digital clock, water, coal, and speed indicators, and a typical railside signal. There is also an indication as to your current position along the line.

The passing countryside and stations are depicted using 3D wire graphics. Unfortunately they aren't very smooth, jumping in big blocks as the train moves forwards, particularly when travelling at speed.

Sound is kept to a minimum and consists mainly of suitable hissing noises and the inevitable whistle.

The program is certainly original. As an attempt to provide something new it succeeds and I enjoyed reviewing it, if only for that.

This game should certainly be a hit with railway enthusiasts and simulator fans, but whether it will catch on with arcade addicts only time will tell.

David Andrews

Sound	8
Graphics	6
Playability	6
Value for Money	6
Overall	7

Product: Citadel
Price: £9.95
Supplier: Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX. Tel: 0532 459453

Super Citadel

THERE are now so many games available for the Electron that we are becoming a bit spoiled for choice. Just occasionally, however, a real beauty comes along, and for me Citadel, from Superior Software, is one of these.

Citadel is a role-playing quest game. A particularly evil dictator has made his base in an old castle and built a teleport system there.

It will be used to transport his invasion force of aliens, and your job is to destroy it. To do this you have to find five crystals hidden in various locations in the castle and its surrounding lands.

Sounds very like a traditional adventure – but now for the arcade bit. One room at a time is shown on screen, complete with your hero. You have to guide him round, up ladders, down ropes, leaping over fires by using conventional control keys Z/X for left/right, and so on.

Move out of the room in any direction and the next room flashes up instantly. Useful objects lying around can be picked up, and a lot of extremely nasty creatures have to be avoided or zapped with a spell.

You need to be pretty quick with the control keys here.

Citadel is great fun, and you need to play the game to appreciate it. I've spent four weeks playing nothing else, and still only solved half the puzzles. Not only is it very enjoyable, it's also very difficult.

For me, it's almost the perfect game. You need arcade skill to move your hero around the castle safely. You need logic to work out the purpose of the various objects.

The game is well programmed, with excellent graphics and sound.

To sum up, as the old advert said, Citadel is sheer enjoyment. Game of the year, for me.

James Bibby

Sound	8
Graphics	9
Playability	10
Value for money	8
Overall	10

Program: Mr Men Magic Story Maker
Price: £9.95
Supplier: Mirrorsoft, Maxwell House, 74 Worship Street, London EC2A 2EN. Tel: 01-377 4600

Magic of the Mr Men

I HAVE found all the Mr Men programs of high quality and of real educational value, and Storymaker is no exception.

This package, comprising two programs, is a real delight to use. It is designed to enable 3 to 6-year-olds to create their own stories on the screen.

I must admit that I've only used it with very young children. However their enthusiasm was astounding.

The first program is picture and word based with six carefully staged levels. The second introduces the concept of sentences and is definitely for the older children. The first program can be used without words – the scenes are created using icons.

Both programs enable stories to be created with six different settings and a choice of eight different Mr Men.

They can do 18 different things and have six different moods. In addition the weather can be set to one of six choices.

The graphics are very good and appear on the screen instantaneously. The different weather conditions are not particularly inspiring – the snow is very disappointing.

The package includes an attractive booklet which can be used by older children to help them enter words and design scenes.

Facilities that are available in the software include the ability to reduce the volume level of the sound or to switch it off completely. Thankfully, pressing Break does not destroy the program but simply returns you to the start.

I can thoroughly recommend this software to any parent wishing to introduce young children to computers.

It can also be used by early readers as a source of reading material and the focus of written work. Full marks to the Mr Men!

John Woollard

Sound	8
Graphics	9
Educational Value	10
Value for money	10
Overall	10

Program: Wordplay
Price: £9.95
Supplier: BBC Soft, 35 Marylebone High Street, London W1M 4AA

Icons can educate

WORDPLAY is an original and innovative idea, attempting to introduce the complex ideas of word processing to young children through the use of animated icons.

These animal icons, rejoicing in delightful names like Selina Seagull and Petronius Pelican, show the child in an amusing and educationally valid manner the various options available in a word processing program.

The icons are permanently displayed at the bottom of the screen below the text window which can display at any time nine of the 33 lines of text possible in the file.

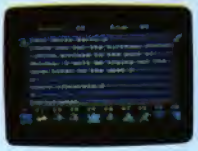
However there are a couple of areas where I feel the program is less than user-friendly and where children may be easily confused.

My chief criticism is reserved for the left and right justification, made by Eve the Elephant and Boris Bear.

Boris tidies by pushing the left margin, but only from column two or greater, and leaves a ragged right result.

The elephant, however, then right justifies back to the first column by tugging, often leaving very large gaps in the text, large enough for words to be included from the line below.

I am not convinced that children will really appreciate how useful word processing can be from this program,



although the excellent booklet will prove an effective tutor.

Phil Taylor

Sound	6
Graphics	8
Educational value	7
Value for Money	7
Overall	7

Program: Primary Time
Price: £7.95
Supplier: Alligata, 1 Orange Street, Sheffield S1 4DW. Tel: 0742 739061

Time in hand

TELLING the time has never been easy for children. These days they can get very muddled with the mixture of analogue clocks and digital watches. Primary Time from Alligata is designed to help children from about four upwards to overcome the problems and become expert time tellers.

The format of the program is very simple. A clock is drawn with its hands set to a random time. The same time is also displayed in digital form. Five possible answers are given and the user has to select the correct one.

The program starts with an instruction page indicating which keys are needed. It then waits for a name to be entered.

Next comes the main menu from which various options can be selected. The simplest only gives o'clock times and then come half pasts, quarters and minutes.

On the o'clock times the computer beeps the correct number of times as an extra help. As for all options, the possible answers are written up the side of a grandfather clock. The cursor that has to be moved is a mouse. Unlike some time-telling programs, this one does not require pin point accuracy when selecting an answer, which makes the package suitable for young children provided they can read.

A pleasant touch is that if the clock shows 1 o'clock the mouse falls down with a musical flourish.

Ten questions are set on the chosen option. Correct answers are rewarded with a Well done. If a child makes a mistake he or she is given the correct answer. A score out of 10 is given at the end.

The graphics make good use of the Electron's high resolution capabilities. They are rather slow because the program is written in Basic.

The various sounds are pleasing enough, but there is no option to turn them off.

The programmers obviously understood the nature of small fingers. The Escape and Break keys are programmed to re-start the sequence. It needs a Ctrl/Break to exit the program.

One minor problem is that the correct answer flashes once when it appears. I don't think many children would notice this.

Children between the ages of 4 and 10 who need help with telling the time could benefit from using this program. The younger ones will need help from a friendly adult. If used sensibly, this is a valuable and worthwhile program.

Rog Frost

Sound	6
Graphics	8
Educational value	7
Value for money	9
Overall	8

MATHS WORKOUT

You don't need to be a donkey to use the EOR technique

MIKE BIBBY
concludes his series on how your Electron works

LAST time we saw how the binary operators AND and OR can be used to combine pairs of binary numbers.

The example we used was that of turning machines on and off under computer control.

Of course these operators have far more uses than this. To illustrate one, consider the Ascii character set. The codes for A to Z are in the range 65-90, while their lower case equivalents, a to z, are in the range 97-122.

Looked at in this decimal way, there seems little relation between the upper and lower case sets. If we look at them in hex, though, we can see that:

A...Z runs from &41 to &5A

a...z runs from &61 to &7A

I hope you can see the pattern.

In fact the numerical Ascii difference between a lower case character and its upper case equivalent is always &20.

Looked at in binary, this difference is %00100000. In other words, bit five is set for lower case, and is clear for upper case – remember, we start with the zero bit.

For example, the code for A is:

%01000001

whereas the code for a is:

%01100001

Similarly, the code for Z is:

%01011010

and the code for z is:

%01111010

In both cases the only difference is in bit five.

So if we have an Ascii code for a letter, we can *force* it to be upper case by clearing bit five to zero. We can do this by ANDing the code for the letter with the mask %11011111 (&DF).

Remember, the bits in the mask that contain 1 will leave the corresponding bits in the Ascii code for the letter unchanged in the resultant byte, whether they be 0 or 1.

On the other hand, the bit in the mask with 0 in it will force the matching result bit to be zero. So:

```
     %01100001  ( the code for a )
AND  %11011111  ( the mask - &DF )
gives %01000001  ( the code for A )
```

It won't surprise you to learn that we can reverse the procedure – forcing upper case into lower case – by using OR to set bit five. This time the mask will be %00100000, the 0s leaving things unchanged in the resultant byte, the 1 forcing a corresponding 1 in bit five of the result bit. So:

```
     %01011010  ( the code for Z )
OR   %00100000  ( the mask - &20 )
gives %01111010  ( the code for z )
```

One further use for AND is to test if a particular bit in a byte is set. We just AND that byte with a mask consisting of a 1 in the bit being tested, with 0s in all the rest. The bits with 0 in them, of course, set the corresponding bits in the resultant byte to zero.

Since the rest of the bits are already cleared to zero by the mask, the only thing that could stop the entire resultant byte being zero is the value derived from the bit under investigation:

- If that bit is set, the corresponding result bit will be set also (1 AND 1 = 1) so the resultant byte will be non-zero.
- If the bit being checked is clear, the corresponding result bit will be clear (0 AND 1 = 0) so the resultant byte is zero.

Those of you starting to learn machine code will soon know, if you don't do so already, that we can differentiate between zero and non-zero bytes fairly easily.

Let's see how this works in practice. If we were testing for bit four being set, the mask would be %00010000 (&20).

Try ANDing this value with %00110100 (&68), where bit four is set, and also with %00101100 (&5B), where bit four is clear, and you'll see that the resulting bytes are non-zero and zero respectively.

So what of EOR. Well, its function is to return a 1 if the pair of bits being combined differ, and 0 if they're identical. Given this, we can use EOR to test which bits in a byte differ. For example:

```
     %10101110
EOR  %11001101
gives %01100011
```

where the set bits neatly mark out the differing pairs.

We can also use EOR to complement or NOT a byte, by EORing it with a mask of %11111111.

Since the mask is all 1s, the result depends entirely on what's in the byte under investigation.

Bits that contain 1s will give 0 (since 1 EOR 1 = 0), while bits that contain zero will give 1, since 0 EOR 1 = 1.

This is exactly what we want to happen with a NOT – change the 0s to 1s and vice versa. For example:

```
     %10101101
EOR  %11111111
gives %01010010
```

We can also use EOR to test

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if two bytes are identical. If the result when we EOR is zero, they must have been identical since every pair of bits must have given zero, which only happens when the bit values are the same.

If there's a non-zero result there must have been a pair of bits that differ, so the two bytes under consideration must differ. For example:

```
    %10101010
EOR %01010101
gives %00000000
```

whereas:

```
    %10101110
EOR %10101010
    %00000100
```

which is, of course, non-zero, since the bytes differ.

You've probably already come across EOR in graphics application programs where it's widely used for its "hey presto" effect.

This is based on the fact that if you EOR a first byte with a second and then EOR the result of that once more with the second byte, the first byte reappears. Look at this, if you don't believe me:

```
    %10111100   ( first byte )
EOR %11110010   ( second byte )
    %01001110   (  result   )
EOR %11110010 ( second byte again )

    %10111100 ( first byte back! )
```

We use this EORing technique to draw things on a background and then move on, leaving the background unchanged. In this case the first byte is the background colour number.

If we then EOR our second byte – corresponding to the colour number of whatever it is we're drawing – on to the background, it will be displayed in the resultant colour number. It's rather like mixing colours mathematically.

To get rid of what we've drawn, we draw it again with the same colour number, once more under the influence of EOR. Of course EORing twice with the same byte gives us the original byte back. This results in whatever it is being drawn appearing in the original, background colour. Hey presto – it's gone!

Suppose we clear the background to colour zero and then draw a line across it in colour one, not just by "sticking it on" but by EORing it on – never mind how. The resulting line will also be in colour 1 since 0 EOR 1 = 1.

But if we EOR the exact same line onto the screen again, still in colour one, it will be going on top of itself.

As the line on the screen is already in colour one, the new line will be drawn in colour zero – since 1 EOR 1 = 0. And, since zero is our background colour, the line "disappears".

```
10 REM PROGRAM 1
20 REM EOR DEMO
30 MODE 1
40 GCOL 3,3
50 REPEAT
60 MOVE 0,0
70 DRAW 900,900
80 FOR DELAY =1 TO 500
90 NEXT DELAY
100 UNTIL FALSE
```

Program 1: Using EOR in graphics

Program 1 gives a demonstration of the sort of technique. The actual details of how it works it are beyond the scope of this series. It shouldn't be too hard to see what's going on, though.

Well, that's the end of the series. Hopefully you'll have gained some idea of the power of binary numbers and the ways they can be combined.

I've only touched on a fraction of the potential uses, but you'll be well equipped to work things out for yourself from now on.

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VECTOR LETTERS

NEIL WRIGHT offers a program to produce double height letters

MOST of the operating system routines are accessed through addresses in RAM called vectors which are stored in the Electron's memory from &200 to &235.

For example, many of you will be familiar with OSWRCH. Well, if you're not, it's the part of the memory called every time you PRINT, DRAW, MOVE or VDU something.

What happens is that the Electron goes to the vector of OSWRCH before going to OSWRCH itself via the address stored in the vector.

This address is stored in two bytes, OSWRCH being &20E and &20F. If you look at these by typing in:

```
PRINT~?&20E
PRINT~?&20F
```

you will receive 2D and DE. Thus the actual address of OSWRCH in the OS ROM is &DE2D. Program I illustrates this.

Notice that it is using &FFEE as OSWRCH. This is the safest way of calling OS routines, because it is the official OSWRCH call recommended by Acorn.

At &FFEE the message is "Jump to the address stored in the vector at &20E and &20F". The actual instruction is JMP(&20E).

Most vectors can be accessed in this way, because this is the official route for calling OSWRCH, or any other routine, since they can be intercepted by putting a different address in the appropriate vector.

Using OS routines like this ensures that if the ROM is updated the present software would still work, since the new address would still be at the address &FFEE.

This is a powerful feature of the BBC Micro and Electron, allowing you to point the vectors to your own routine by simply entering its memory location into the vector.

There are 27 vectors in all, and the first of these, at &200 and &201, is initially unused. It is called the user vector and is very useful, although few people are aware of it since it's not even mentioned in the User Guide.

It effectively allows you to add extra commands to the Electron without toolkit ROMs and such like.

The user vector can be called when:

- *CODE is called, which

→

```
10 REM PROGRAM 1
20 FOR I%=0 TO 2 STEP 2
30 P%=&C00
40 oswrch=!(&20E AND &FF
FF)
50 COPT I%
60 .print
70 LDA#ASC"M"
80 JSR oswrch
90 LDA#ASC"0"
100 JSR &FFEE
110 LDA#ASC"P"
120 JSR &DE2D
130 RTS
140 ]NEXT
150 CALL print
```

Program I

MACHINE CODE ROUTINES

check	New routine for user vector. Tests for a *LINE, otherwise jumps to &E07E.
db_ht	Beginning of main program. Stores text address, gets POS and VPOS and sets loop counter.
loop1	Loop which continues until it reaches a carriage return (CHR$(13)).
cont	OSWORD call and main subroutine calls.
vdu23	Beginning of the character defining sequence.
loop2	Small loop which does the defining, as well as part of the re-positioning of the text cursor.
vdu31	Second half of re-positioning and prints the character (CHR$255).
break	New routine for BRK vector. Restores the user vector address to &C00.

VARIABLES

ct%	Loop counter.
T%	Time variable.
?&201	High byte of user vector.
?&200	Low byte of user vector.
&70	Used to store Ascii value of present character in text string.
&71 to &78	Used by OSWORD to store new character matrix.
&79	Loop counter.
&7A	Temporary storage location.
&7B	Value of POS.
&7C	Value of VPOS.
&7D	Low byte of text string address.
&7E	High byte of text string address.
CHR$(255)	Used for each character sent from OSWORD.

```
  10 REM PROGRAM II
  20 FORIX=0 TO 2 STEP 2
  30 P%=&C00
  40 new_user_routine_addr
=&C00
  50 ?&200=new_user_routin
e_addr MOD256
  60 ?&201=new_user_routin
e_addr DIV256
  70 [OPTIX
  80 .check
  90 CMP#1
 100 BEQ beep
 110 JMP &E07E
 120 .beep
 130 LDA#7    \equivalent V
DU7 (CTRL G)
 140 JSR &FFEE
 150 RTS
 160 ]
 170 NEXT
 180*LINE Electron!
```

Program II

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takes two values in the X and Y registers.

- *LINE is called, which can take a text string with the address of this string in the X and Y registers.
- OSWORD call with a value between &E0 and &FF in the accumulator is made.

The default address in the vector – the address there when the Electron is switched on – points to the error message Bad command at &E07E. Try it and see.

To be able to use an extra command you have to redirect the vector to a routine of your own, hence the name of the vector.

Program II is a Basic but adequate example of this. It uses *LINE only, and on detecting it simply beeps (VDU7).

However, you must account for all possibilities, so if you use *CODE or make one of those 32 OSWORD calls it still prints the error message.

But this is only an example

```
  10 REM PROGRAM III
  20 REM Vector Letters
  30 REM by N.B.Wright
  40 MODE4
  70 *FX247,76
  80 *FX248,8
  90 *FX249,12
 100 VDU23,1,0;0;0;0;
 110 VDU19,1,2;0;
 120 PROCassemble
 121
 130 REM Demonstration
 140 TIME=0
 150 FORIX=0TO30STEP2:VDU3
1,1,IX
 160 *LINE THIS IS A DOUBL
E HEIGHT LETTERS DEMO!
 170 NEXT
 180 PRINTTIME
 190 TX=TIME:REPEATUNTILTI
ME>TX+500
 200 CLS
 210 VDU31,10,10
 211
 220 *SAVE"M/C" C00+98 C86
 230 END
 231
 240 DEFPROCassemble
 250 FOR pass%=0 TO 2 STEP
 2
 260 osbyte=!(&20A AND &FF
FF)
 270 osword=!(&20C AND &FF
FF)
 280 oswrch=!(&20E AND &FF
FF)
 290 new_user_routine_addr
=&C00
 300 ?&200=new_user_routin
e_addr MOD256
 310 ?&201=new_user_routin
e_addr DIV256
 320 P%=&C00
 330 [OPT pass%
 340 LDA#new_user_routine_
addr MOD256
 350 STA&200
 360 LDA#new_user_routine_
addr DIV256
 370 STA&201
 380 RTS
 390 .check
 400 CMP#1    \If A=1 then
 user  vector routine call
is a *LINE call.
 410 BEQdb_ht \branch to d
ouble  height routine.
 420 JMP&E07E \normal erro
r message
 430 .db_ht
 440 STX&7D   \LB of text
addr
 450 STY&7E   \HB of text
addr
 460 LDA#134
 470 JSRosbyte\ #FX134
 480 INX
 490 STX&7B   \ Store POS
 500 STY&7C   \ Store VPOS
 510 LDY#&FF  \ set counte
r
 520 STY&79
 530 .loop1
 540 INY
 550 LDA(&7D),Y\ get chara
cter
 560 CMP#&D   \ is it a 'r
eturn'?
 570 BNEcont  \ if not con
tinue,
 580 RTS      \ otherwise
finish.
 590 .cont
 600 STA&7B   \ store ASC
of Chr
 610 LDA#10   \ send ASC t
o OSWORD
 620 LDX#&70  \ to enlarge
 630 LDY#0    \ character
matrix
 640 JSRosword
 650 LDY#0
 660 JSRVdu23
 670 CLC      \ clear carr
y(C=0)
 680 JSRVdu31
 690 JSRVdu23
 700 SEC      \ set carry(
C=1)
 710 JSRVdu31
 720 INC&79   \ increaent
counter
 730 LDY&79   \ Y=counter
 740 JMPloop1 \ goto loop1
 750 .Vdu23
 760 CLC      \ Char. defi
ning
 770 TYA      \ sequence
 780 ADC#4
 790 STA&7A
 800 LDA#23
 810 JSRoswrch
 820 LDA#255
 830 JSRoswrch
 840 .loop2
 850 LDA&71,Y \ load A wit
h new Chr.
 860 JSRoswrch\ matrix fro
m OSWORD
 870 JSRoswrch\ and define
CHR#255
 880 INY      \ Y=Y+1
 890 CPY&7A   \ compare wi
th &7A
 900 BNEloop2 \ branch if
not 0
 910 LDA#31
 920 JSRoswrch
 930 LDA&7B   \ get POS
 940 ADC&79   \ add loop c
ounter
 950 JSRoswrch
 960 RTS
 970 .Vdu31
 980 LDA&7C   \ get VPOS
 990 ADC#0    \ add carry(
1 or 0)
1000 JSRoswrch\ print it
1010 LDA#255  \ get CHR#25
5, print it.
1020 JSRoswrch
1030 RTS
1040 .break   \ Intercept
BRK vector   to restore '*L
INE' command after (CTRL)
BREAK.
1050 LDA#247
1060 LDX#&4C  \ op. code f
or 'JMP'
1070 JSRosbyte
1080 LDA#248
1090 LDX#0    \ The '00' o
f &C00
1100 JSRosbyte
1110 LDA#249
1120 LDX#&C   \ The '&C' o
f &C00
1130 JSRosbyte
1140 JMP&C00:]
1150 NEXT:ENDPROC
```

Program III

> *. . . adding a useful, and often wished for, command to the Electron*

and does not use the command to its full potential.

Program III does this by demonstrating this valuable option and also adding a useful, and often wished for, command to the Electron.

It's a double-height letters routine, and it uses two vectors, the BRK vector and the user vector. On detecting a *LINE command the address of the text following it is stored in the X and Y registers as a two byte memory location.

Also, because of the nature of the program, POS and VPOS are needed and are found by executing *FX134. A fairly complicated loop is then set up, by which each character is taken in turn and tested to see if it is a carriage return.

If not, it is sent to OSWORD, which redefines it and prints the new character at the current POS and VPOS positions. This continues until the CR is reached. Of course all this happens extremely quickly.

The Break vector handling is also interesting. It's an example of how to intercept the Break key by re-pointing its vector to a special routine which restores the user vector every time Break (even Shift + Ctrl) is pressed. This is done using *FX247, 248 and 249.

```
*FX247,X
*FX248,Y
*FX249,Z
```

tells the computer to perform the assembly language opcode X, followed by the address used by the opcode as Y+(Z*256).

In Program III's case it says "Jump to &C00", where it re-points the user vector. This means that the command is always available, even after you press Break until you switch off.

However the command does have limitations. Although fast and compact the following cannot be done:
*LINE You are entering a large cave :PRINT "Under a hill".

Unfortunately it can't distinguish between the colon as a line splitter and the colon as an Ascii code (but it could be made to).

You must remember that the text will be printed at POS and VPOS, so you will probably have to reposition them before the command using VDU31,x,y.

Also the top of the first character is printed first – not the bottom.

You can use it in any mode, and it can be treated as an equivalent CHR$(141) used by the BBC Micro in Mode 7, which we Electron users have been denied.

I find it useful when typing in BBC Micro programs which have to have all the pretty titles chopped out for Electron conversions.

Also note that the program *SAVEs a section of memory after the demo and speed test – this is simply the assembled machine code in its compact form, taking up only 155 bytes of memory.

It can be used later instead of the main program if preferred and, once saved, only has to be loaded using *RUN or */.

This loads it in below PAGE, so after loading and pressing Break you have an extra command at your disposal.

Alternatively Program III could be chopped down to the bare essentials, squeezed on to several lines and *SPOOLed as a procedure which can be EXECed later on to the end of your own programs.

An idea for improvement would be to add the facility to include the screen coordinates desired into the command, for instance:
*LINE ELECTRON USER IS BRILLIANT, 5,10.

The rest is up to your own imagination.

HARDWARE REVIEW

Sidewinder – joy with your ROMs

THE re-birth of interest in the Electron has persuaded many manufacturers to invest in new hardware add-ons.

These extras come in all sorts of shapes and sizes, and with many differing uses. The Sidewinder from Wizard Development Company is a two-in-one device, combining a joystick interface and a sideways ROM card.

It is housed in a sturdy plastic box which connects straight to the computer's expansion port. You don't need anything else to use it.

The box will make your Electron about four inches deeper. A connection on the rear of Sidewinder allows other devices such as the Plus 1 to be added as well.

The strong but clear plastic lid allows you to see what ROMs are installed. The connection for the joystick is, conveniently, at the side. In fact it's a well thought out and well constructed device.

The joystick port allows the use of switched Atari style joysticks for the majority of games. If you have Plus 1 analogue sticks they will not work on Sidewinder.

Most games players prefer the more positive feel of the switched style, so you could decide that Sidewinder was useful for games even if you have a Plus 1.

It is very easy to use as it carries its own software in one of the sideways ROM sockets.

On power up you just type *JS ON. You are then prompted to enter the normal control keys for the program you wish to use, and to load the program in the usual way.

You will still be able to play the game from the keyboard or, hopefully, with a joystick.

Some games just wouldn't work with joysticks. Repton2, for example uses the memory that the joystick requires. Killer Gorilla, for some reason would not work and Swag refused to load.

All other games that I tried – some two dozen – ran properly on joysticks, including programs I had written myself.

I consider that a very high success rate.

Alongside the joystick software are three empty sockets. Into these you can plug sideways ROM software.

The Electron has a very clever operating system which can allow up to 16 16k ROMs to share the same piece of memory. This means that with Sidewinder fitted you could have a computer with 96k of ROM as well as the 32k of RAM.

These extra sockets are invaluable for the more serious computer user. Sideways ROMs make word processors, spreadsheets, databases and hosts of other applications software instantly available.

And if you want a break from the serious stuff a few games are also produced on ROM because they are much harder to copy and leave much more memory free for data.

The socket that has the joy ROM in can be configured for 4k, 8k or 16k ROMs. The other three sockets can only take ROMs of 8k and above. There is no provision for sideways RAM.

There is one drawback to Sidewinder though. If you wish to use a printer, or upgrade to discs, it will make your system rather cumbersome, and I would suggest other ways of adding ROM capability to your computer.

However if your needs are for a competent joystick port for games, and for some serious applications as well, Sidewinder could be a winner. It certainly represents good value for money at £39.95.

Roger Frost

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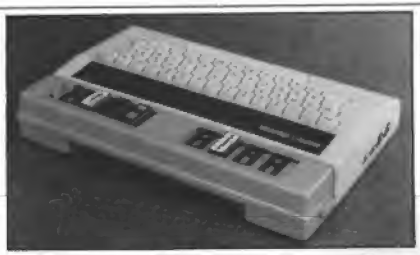

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Negative INKEYs are an entirely new ball game

PETE BIBBY considers the positive advantages of negative numbers

WE'VE already looked at alternatives to INPUT as a way of getting information in to programs, examined GET and GET$, and went on to INKEY and INKEY$.

We have also met the keyboard buffer and seen how to flush it with a quick:

```
*FX21,0
```

There is another way of using INKEY. Up till now we've used it with a positive number in the following brackets. This specified how long the program would wait for something to enter the keyboard buffer before it pressed on.

However, if this number is negative then it's a whole new ball game. Each key on the keyboard has a negative number that corresponds to it.

There doesn't seem to be any rhyme or reason to what number goes with what key. Figure I shows a few examples.

KEY	INKEY NUMBER
1	-49
2	-50
3	-18
A	-66
B	-101
C	-83
Y	-69
N	-86
SPACE	-99
ESCAPE	-113

Figure I: Some negative INKEY numbers

Now the program doesn't wait – it looks directly at the keyboard, ignoring the buffer. If the key specified by the negative number is being pressed then the negative INKEY returns the value TRUE. If it's not being pressed then it returns FALSE.

The Y key has the negative INKEY number –69. So, if you want a program to do something if Y is pressed you'd use:

```
IF INKEY(-69) THEN do
something
```

It doesn't matter if it's upper or lower case – the Electron just looks at the key and if it's being pressed, that's good enough. Program I uses it to test for Y and N and respond appropriately.

```
10 REM Program I
20 PRINT "Press Y or N"
30 ykey=FALSE
40 nkey=FALSE
50 REPEAT
60 IF INKEY(-69) THEN yk
ey=TRUE
70 IF INKEY(-86) THEN nk
ey=TRUE
80 UNTIL ykey OR nkey
90 IF ykey THEN PRINT "Y
ou pressed Y" ELSE PRINT "Y
ou pressed N"
```

Program I

Both *ykey* and *nkey* are logical variables, originally set to FALSE. The program then enters a REPEAT . . . UNTIL loop which carries on until one or both of the flags is TRUE.

Inside the loop are two negative INKEYs. One looks at the Y key (–69), the other at the N key (–86). If either is being pressed then the appropriate flag is set to TRUE.

You can press all the other keys you want but only Y or N will stop the loop and get the message. You also get all the other letters that have been piling up in the keyboard buffer.

One of the more useful jobs a negative INKEY is used for is the terminating condition of a loop. Program II is an example.

Here the loop keeps cycling until the spacebar (–99) is pressed, and then the program immediatley halts. Used in this way it's a good method of getting a keypress to jump the queue of the keyboard buffer.

I'm sure that you've come across one of those irritating programs where you've been playing a game and press a key to end it. However, the program carries on until the keyboard buffer has ended and then stops. Well, a negative INKEY is the cure.

```
10 REM Program II
20 REPEAT
30 PRINT "I'm doing some
thing"
40 UNTIL INKEY(-99)
50 PRINT "I've stopped"
```

Program II

Program III shows how negative INKEYs can be used to move an asterisk around a screen.

The first seven lines just set up variables, clear the screen and get rid of the flashing cursor (line 70). It's the REPEAT . . . UNTIL loop formed by lines 80 to 210 that moves the asterisk in response to the keyboard.

The asterisk is originally printed using TAB and the variables *oldDown* and *oldAcross*. Then the program goes through a battery of tests to see which, if any, of the cursor keys is being pressed.

If any are, then new values are calculated and held in *newAcross* and *newDown*. These are the TAB parameters needed to move the asterisk one character position in the direction indicated by the cursor key.

The old asterisk is obliterated by having a space drawn over it and the values held in the newly calculated

```
10 REM Program III
20 oldAcross=20
30 newAcross=20
40 oldDown=12
50 newDown=12
60 CLS
70 VDU 23,1,0;0;0;0;
80 REPEAT
90 PRINT TAB(oldAcross,o
ldDown) " "
100 IF INKEY(-26) THEN ne
wAcross=oldAcross-1
110 IF INKEY(-122) THEN n
ewAcross=oldAcross+1
120 IF INKEY(-58) THEN ne
wDown=oldDown-1
130 IF INKEY(-42) THEN ne
wDown=oldDown+1
140 PRINT TAB(oldAcross,o
ldDown) "*"
150 oldDown=newDown
160 oldAcross=newAcross
170 IF oldAcross<0 THEN o
ldAcross=0
180 IF oldAcross>38 THEN
oldAcross=38
190 IF oldDown<0 THEN old
Down=0
200 IF oldDown>23 THEN ol
dDown=23
210 UNTIL INKEY(-99)
```

Program III

variables are transferred to the old position variables.

They are then tested and adjusted to make sure they don't run off the screen or cause it to scroll. The loop cycles and the process begins again.

The whole thing can be stopped by pressing the spacebar. As said before, a negative INKEY makes a useful break. If you like the idea of making things move or want to know more about TAB I suggest you look at Trevor Robert's new graphics series.

Figure I gives some negative INKEY numbers to play around with. You'll find a fuller list on page 159 of the Electron User Guide. Meanwhile let's go onto the @% we first met a couple of months ago.

@% is used to control how numeric output appears on screen and to what accuracy. For example, if you enter:

```
@%=&020A0A
```

you get print fields 10 characters in length as normal, but also all figures are displayed to three decimal places. You'll have seen the print fields in action when you entered lines like:

```
PRINT 1,2,3,4
PRINT "a","b","c","d"
```

in your early programming days. They're the invisible divisions in the screen that are used to position output. At switch on there are all 10 but @% can change that.

We have this control over how numeric output is displayed because @% can be used to select between three different screen formats. This is achieved by treating it as a three byte hexadecimal number of the form:

```
@%=&xxyyzz
```

If you don't know what a hexadecimal number is don't worry too much. You can understand what follows by looking on *xxyyzz* as a code number that the Electron uses to find out how it is to print numbers on the screen.

To know more about hexadecimal look at the Maths Workout in the June 1984 issue of *Electron User*.

Let's take the *xx* part of *xxyyzz* first. This can take one of three values, either 00, 01, or 02. These numbers determine which of three print formats will be used.

If you use 00 the Electron goes in to what is known as General Format. This is basically the format the screen is in when you switch on.

It allows you to write numbers to the screen as usual. It only goes into the exponential form when the number to be displayed uses up all the field allocated. More on exponentials later.

Ignoring the *yy* part for the moment let's look at *zz*, which is simply the length of the print field you want in hexadecimal. So if you want a print field 10 characters long *zz* becomes 0A.

The value in *yy* tells the micro how many character spaces of the chosen field can be used before it must start printing numbers in the exponential form.

Suppose you enter:

```
@%=&000A0A
```

What you've done is to select General Format (*xx*=00), told it that if the numbers it prints are over three figures long it will have to display them exponentially (*yy*=03), and that the print fields are to be 10 characters long (*zz*=0A).

Don't worry too much if this doesn't make much sense at first. It's one of those things that are difficult to grasp in theory but easy in practice. A few minutes playing around with Program IV will make it clear.

The second format is the Exponential Format. In this as you might guess, numbers are displayed in exponential form – this means they are shown as decimals multiplied by the appropriate power of 10.

The decimal comes first, then the letter E to show that it's an exponential, followed by the power of 10. In exponential form 100 becomes 1E2 (1*100) while 1230 becomes 1.23E3 (1.23*1000).

```
  10 REM Program IV
  20 INPUT "Four numbers "
a,b,c,d
  30 REM General Format
  40 @%=&000A0A
  50 PRINT "General Format
"
  60 PRINT a,b,c,d
  70 REM Exponential Forma
t
  80 @%=&010A0A
  90 PRINT "Exponential Fo
rmat"
 100 PRINT a,b,c,d
 110 REM Fixed Decimal
 120 @%=&020A0A
 130 PRINT "Fixed Decimal"
 140 PRINT a,b,c,d
```

Program IV

To go into exponentials more fully have a look at the Maths Workout in the March 1984 *Electron User*.

We obtain exponential form by picking 01 as the value of *xx*. Once in Exponential Format *yy* is used to specify how many figures we want before the E of the exponential.

If we want two figures before the E, not counting the decimal point, we let *yy* become 02. As you might expect *zz* is used to determine how many characters are wanted in the print field.

If you enter:

```
@%=&010408
```

what you get is the exponential format (*xx*=01), four figures – and a decimal point – in front of the E of the exponent (*yy*=04), and the print fields are set at eight characters (*zz*=08).

Again, don't worry if this isn't clear at first – just play around with Program IV.

First input 10, 100, 1000, and 10000 and see what happens, then get more adventurous. You'll soon see how Exponential Format works and the effect the *yy* part can have on the accuracy of the figures displayed.

The final format is the Fixed Decimal Format, selected by entering 02 for *xx*. This allows us to select the number of decimal places we require in our output by using *yy* to specify them. *zz* is used to determine the print fields.

As an example, try:

```
@%=&02030C
```

This selects the Fixed Decimal Format (*xx*=02) – the figures will be accurate to three decimal places (*yy*=03) and the print fields will be 12 characters long (*zz*=0C). Remember that it's hexadecimal and note that you can only go up to nine significant figures.

There, easy isn't it? Well maybe not at first glance, but a few goes with Program IV should soon make you more confident. Try feeding it different numbers and see what happens. And when you're feeling more adventurous try changing @% yourself. Figure II sums it up.

● *That's where we'll leave it for now. Next month we'll be looking at how we can write our own functions.*

FORMAT	XX	YY	ZZ
General	00	number of places until exponential form used	field length
Exponential	01	number of figures in front of E	field length
Fixed Decimal	02	number of decimal places	field length

Figure II: All about @%

Something special is on its way...

I MUST tell you about a new adventure I have been trying to solve. ***Rick Hanson*** from Robico will be reviewed shortly, but meanwhile let me say that it is the best I have seen since ***Wheel of Fortune.***

Now to work. Apologies to Larry Horsfield for spelling his name wrong last month. He would like to thank those of you who have written to him in the belief that he is Merlin, but points out that he is not. I am.

Any addresses given in Contact Corner are from readers who want to get in touch with each other about adventures, so please don't write to them with problems, write to me at *Electron User.*

G.R. Poole says you can have an unlimited inventory in ***Sphinx Adventure.*** When you get the "you can't carry any more" message, rub the ring and fill the bottle with water from the lake.

Return to the object you wanted to pick up, drop the water, and you should now find that you can get the object. Apparently, this will work any number of times.

Robert Henderson has given further tips on using the bad program fixer from the December 1985 issue. To stop the dwarf killing you:

- Load Sphinx as normal.
- Press Ctrl+V and 6.
- Call the bad program fixer.
- Alter line 194 to PRINT "It misses".

Now run the program as normal and you'll find that the dwarf is no longer a problem.

Mark Giles asks if ***Quondam, Seventh Star, Kingdom of Hamil*** and ***Gateway to Karos*** are to be released for the Electron.

As far as I know there are no plans to release them, but if you all write to Acorn asking for them to be released, they may be persuaded that there is a demand for them.

Marty Adam and Andrew Milner have sent in details of how to finish ***Hampstead.*** I won't spoil it for anyone, but I will say that a return to your roots is mandatory.

Rick Harrowing complains about ***Castle of the Skull Lord*** from Samurai Software, saying that there is a bug in it that causes it to crash if you try to make more than three inputs.

The shop where he bought the program seem unwilling or unable to accept that the program is faulty and won't help him either.

I haven't come across this program before and am unable to trace Samurai Software but if they would like to send me a copy of the program for evaluation I will report back on it.

Meanwhile, I suggest you try it before you buy.

Karen Robinson says that the save-game facility in ***Terrormolinos*** won't work with the Plus 1 fitted unless you type in the routine for disabling it given in the February 1986 column.

SOS

Terrormolinos is causing problems for a lot of readers this month. I confess that I haven't looked at it yet and would welcome any maps and solutions that you care to send in.

Meanwhile Karen Robinson, Marty Adair, Billy Ruane and Michael Peters would like help with the following: Why do you need to go snorkelling in the bay?

How do you take the excursion on the coach? Where do you take the tenth picture? How do you get the camera off of the shelf and get into the loft to get the suitcase? How do you use the switch when you have got into the loft?

Strange Odessey is causing problems for Michael Peters and Jonathan Sambrook. Can anyone tell them how to translate the writing on the boulder?

Jason Palmer wants help with ***Escape from Pulsar 7.*** He has mixed the ingredients but cannot find out how to bake the cake.

He also wants to know what the "something happened" is when he closes the door in the crewman's cabin, what the grit, auto-dispense pillow and chips are for, and how to fit the lathe.

Andy Hollis asks how to kill the animated skeleton in ***Arrow of Death Part 2.***

Can anyone tell Mark Giles where the tube with the lever on the side is in ***Gateway to Karos?***

Derek Willoughby asks where the last stone is and how to cross the pit in the ***Five Stones of Anadon.***

Jonathan Williams has some problems with ***Countdown to Doom.*** He wants to know what to use the sword for, what the rat can do for him and what it means when it calls you a CAD.

Feedback

Mike Herring tells Darren Woodward that the pagage in ***Pettigrew's Diary*** is a package and that he should throw stones at it from the construction site – assuming there are no policemen about.

Nick Southgate offers help with ***Galadriel in Distress.*** To read the runes use the magnifying glass which you must steal from the orcs by the castle – but remember to shut the gate.

Jason Palmer answers questions raised in the December 1985 issue about ***Sadim Castle.*** To get the knife go to the hunting lodge and climb a nearby tree. Here you will find the keys that allow you to get into the lodge. You will find the knife inside.

Forget the metal door – there is nothing you can do about it.

Try going through different gates to get the wheelbarrow to the castle. You'll find it's a good idea to use that knife on the cheetah first though.

Hall of Fame

Greedy Dwarf – *David Carlton*

Once you reach Westminster Abbey drop the flask and amulet. Go west and then run west. Then go: W-W-S-Get gloves-N-NE-S-N-UP-S-S then jump east and take the wand. Jump west and then go N-NE-UP-W-NE-NE and you are in the tight squeeze.

Go east and then run east. Wave the wand and then drop it. Take the keys and then go: E-E-S-S-Take chain-Down-E-SE-Up-Unlock the door and open it and then go east into the leafy glade. Go south twice and get the dynamite and then keep going south until you reach the dog.

Then go W-W-Down, say Kazad and you will find yourself in a cave. Go west, drop the keys-W-W-W take the box, S-UP, light the dynamite and drop it down, and then wait. Then go up and you will find you can get back through the gate.

Wheel of Fortune – *Derek Willoughby*

Before trying to get into the machinery housing save your position, then use the hairpin to pick the lock. You'll have to keep trying. If you get arrested quit and start again.

To get past the dragon, throw a bucket of water over him. You need the empty cup to carry the oil so don't lose it. The sword, truncheon and gun will land you in jail if the policeman catches you with them.

Once you have scared the troll with the snake and basket store all your treasure inside his cave – but remember to leave the basket outside. When you come back at the end of the game – save your position on tape as the troll sometimes comes back.

Blue Dragon – *Paul Edmans*

To get past the slug use the words from both of the parchments. If an enemy attacks say Zifro to kill him. Do not use this too often. Like all spells it has a limited life.

Once the slug is dead you can go down the passage to the location where the first parchment was. Don't forget to take the dragon dust with you as you may not be able to return. If you have trouble with the wizard once you have come down the beanstalk with the dust, play the flute.

Now go to the galley and rub the amulet. Leave the galley and use the boat to cross the water to the island. Make sure you remove and drop the ring before meeting the giant and he will give you some directions. To get past the goblin at the fort play the flute again. Go down the hole and empty the urn to finish the game.

Problem Corner

Sphinx Adventure is still creating problems. Karen Robinson wants to know where to find the letters DAVE KNEW and the inner sanctum. Use DIAXOS when you have crossed the lake.

She also wants to know why you must kill the vampire. I don't know. I didn't try to complete the game without killing him.

Rick Harrowing wants to know how to get out of the ship in ***Strange Odessey.*** Wear and close the spacesuit.

Greedy Dwarf is bemusing Marty Adair. The axe head is needed so that you can make an axe and chop down a tree to cross the river. You'll find it after you have waved the wand at the chasm.

Marty is also in difficulty in ***Classic Adventure.*** To get to the pirate's chest from the vast hall go west, wave rod, cross the bridge W-S-E-S-S-S-N-E-E-NW.

Robert Henderson, Michael Peters and Paul Duggan need help with ***Hampstead.*** Use the screwdriver on the filing cabinet. The club is N-W-N of Regent Street. The boardroom is inside the bank.

You need to have a reference to get the job in the

→

From Page 25

bank. Visit the club first. Yes, you need the business suit – visit your tailor.

Have you translated the code? No, you can't win in the betting shop.

The sandwich isn't used. The route through the industrial estate to the lathe bracket is Entrance N-E-E-NE-E-E-NE-N-Get the bracket-SW.

Chris Lowe has asked what the password is in ***Kingdom of Klein.*** He has the letters POLYGOTO and he's also got the password, though not in the right order.

Darren Rodgers is stuck in ***Countdown to Doom.*** Stop the blob with the fishing net. There is one entrance and one exit to the artefact. Make sure you know which is which and then lose your inventory.

"Write steep and read flat" is a clue to help you decipher the letters on the side of the artefact. Write five letters, then five underneath and so on. Read what you have written. One way or another it will make sense.

Michael Peters is bogged down in ***Adventureland.*** To get out of the quicksand try swimming. The flint and steel will dispose of the bricked up window if you have a suitably filled container of swamp gas. The bees will wake the dragon.

Spiderman is baffling Mark Hunter and Craig Dilly. To get the printing presses running you must load the scale and use the computer. When you find the strange cloud jump for one location, then return and go up. After getting Dr Octopus's arm you can dispose of Electro.

Geroen Hendrix from Holland wants help with ***Wheel of Fortune.*** He has come back up through the trapdoor but is now stuck.

Take the wheel to the hut and spin it.

Andrew Ralford is unable to kill the dragon in ***Twin Kingdom Valley.*** Rescue the princess and get the silver key.

Go to the west turret in the desert king's castle and get the wooden staff.

Hit the dragon with it and you can get the master key. This will open any door.

Andy Hollis wants to know what the armchair is for in ***Dracula Island.*** If you sit in it you will hear a noise – this is a secret panel opening somewhere.

Find something heavy, sit in the armchair and drop the heavy object, then go and look for the secret passage.

Andy and R. Andrews are stuck in ***Ring of Time.*** The ring is in the cemetery, but you must ride the horse first.

You don't get past the abbey, just explore it. Try searching the stables and looking down the opening near the field.

Crown Jewels is creating problems for Mario Ambrosi. Give the ring to the old man to get the key to the cells. The drugs must be put into the coffee of the man on Tower Bridge.

The domestic and flashy will earn you some money if you use them correctly.

Finally, R. Andrews is in the dark with the ***Stolen Lamp.*** To prevent the pickpocket from doing his job you must hit him with the sledgehammer from the desert.

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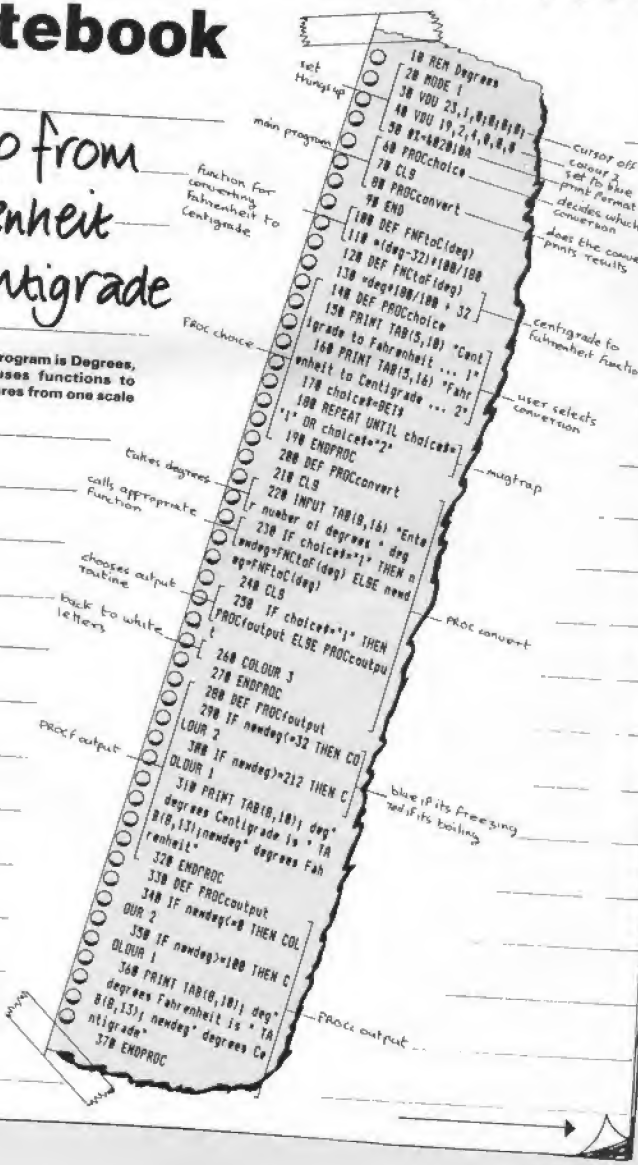
Notebook

Swap from Fahrenheit to Centigrade

THIS month our program is Degrees, a program that uses functions to convert temperatures from one scale to another.



Notebook

From Page 27

PROGRAM NOTES

20 Puts the Electron into Mode 4, a four colour mode.

30 Switches off the annoying flashing cursor.

40 Logical colour 2 is given the actual colour 4. Now after a COLOUR 2 command text will appear as blue. Previously it would have been red.

50 Giving @% a hexadecimal value decides on the print format, that is, the way that strings and numbers appear on the screen. The 02 decides on a fixed decimal format, the 01 fixes the number of decimal places as one. The 0A (decimal 10) sets the number of characters in a field.

60-80 The body of the program. PROC-choice gets the user to tell it which conversion it wants. The CLS just clears the screen. PROCconvert actually does the conversion and gives the result.

90 Stops the program running into the function and procedure definitions that follow. Leave it out and see what happens.

100-110 Defines the function that converts Fahrenheit to Centrigrade. The number of degrees is held in the parameter *deg*. The weird-looking line 110 does the necessary calculation and sets the value of the function to its result. The start of a function definition is shown by a DEF FN, the end by the equals sign. There could be several lines in between. Try adding.

```
100 DEF FNFtoC(deg)
102 sum=deg-32
104 sum=sum*100
106 sum=sum/180
110 =sum
```

120-130 which do the same job as the old line 110 but more long-windedly. Establishes the Centigrade-to-Fahrenheit function. Whenever FNCtoF(deg) is used in a program, the micro will do the calculation for the particular value of *deg* and use the result in the place of FNCtoF(deg).

140-190 Form PROCchoice, the procedure that gets the user to tell the program which conversion to do. A mugtrap, not allowing the program to proceed until *choice$* is either 1 or 2.

200-270 Make up PROCconvert, the bit that does the work.

220 Takes the number of degrees and stores it in *deg*.

230 Uses *choice$* to decide which of the two functions to use. Whichever it is, the resulting value is stored in *newdeg*.

250 Again *choice$* is used, this time to choose between the two procedures that display the results of the program. Notice that these procedures are themselves called from within a procedure.

260 Ensures that the foreground colour is restored to white. It's always good practice to restore the state of the Electron to how it was before the program ran. In this case there are still some things to do to undo the effect of the program. Can you figure them out and remedy them? VDU and @ are clues.

280-320 PROCfoutput displays all the information about the Centigrade to Fahrenheit conversion.

290-300 Ensure that if it is freezing or boiling, the output message is of an appropriate colour, blue or red.

330-370 Handles the output for the Fahrenheit to Centigrade conversion. Notice that lines 340 and 350 are very like lines 290 and 300. Can you rewrite the program using a flag to choose the colour of the output?

Trevor Roberts

START OF A NEW SERIES

EDUCATION ON THE ELECTRON

A word processor, the ideal first piece of educational software

IF you have youngsters who use an Electron you may feel that you've got a problem.

You bought your children a computer, convinced it would benefit their education and all they seem to do with it is play games.

They love it, but there do not seem to be many educational programs and you are told that they can be of poor quality.

The program Numbers are Fun that you bought with the computer is already gathering dust, dismissed by the children as boring.

This series of articles is designed to help parents who find themselves in that all-too-familiar position, as well as school pupils who wish to make the best use of the computer.

Over the next few months we'll look at the ways in which schools make use of computers and how you can use the same techniques on the Electron at home.

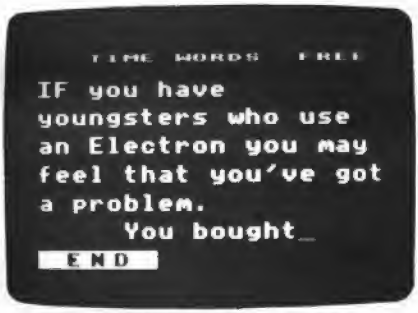
We'll start with an area that is becoming more and more important in schools and is also having a major impact on the employment scene – word processing.

Many people will be rather hazy as to what word processors are and why they are so useful. A word processor is really a clever typewriter – the advantage being that you don't type straight on to paper.

In fact the typing that you do is stored in the computer's memory and displayed on your TV screen.

When you have filled one screen, the text scrolls off the top of the screen and out of sight, but the computer has not forgotten it. Your work is still in memory and by using cursor keys you can scroll any of the text back into view.

So far the word processor as described has no advantage over the typewriter and paper. However, the clever part is that any writing that is stored in the computer's memory can be altered – re-spelt, deleted, moved or replaced – without having to change all the text.



Mini Office double height editing screen

If anyone is writing an essay and realises that a word is wrongly spelt near the start the error can be easily put right.

When the work is completed it can be stored on tape or disc and kept, or simply printed out on paper.

Most word processor programs will not spot a spelling mistake for you, and there is no actual knowledge that use of a word processor can impart.

In schools, though, many of the best and most used programs do not have any subject matter built into them. They are just tools that teachers can use to help them to develop ideas.

The word processor falls into this category.

Teachers consider the main benefit is that the pupil can easily re-draft a piece of work and so be able to produce writing of a higher quality.

Few people produce perfect text first time and if the effort of writing the whole lot again is too much most of us would be satisfied with a rather poor first attempt.

However, it becomes a real pleasure for youngsters if they can write something that is as perfect as possible.

Pupils of all ages are using word processors in schools. A number of programs are designed to be easy to use and suitable for five year olds, while others are of a near professional standard. But one thing is for certain – any child old enough to read and write can benefit from a word processor.

Nevertheless there are some problems. Many people, both children and adults, are rather slow at using a keyboard to start with. It is obviously a benefit if you can type, but it is not essential.

After about an hour a child's typing speed will match the speed at which he or she can actually think. When that typing speed has been achieved the child is probably keyboard familiar.

The next problem may be the lack of a printer. It's a great help to have a printer and be able to produce your own finished document but you can get away without one of your own.

You will need to know where you can use one though if you want to make full use of your processor.

The vast majority of schools have got a printer and a computer that is compatible with your Electron and most will gladly help out by allowing pupils to print out their work.

In schools word processing is carried out by pupils of all ages, abilities and in any subject.

Children at home could start by doing some written homework on the computer. Once a child gets into the habit of working with a word processor all sorts of uses crop up.

Most of us have to write letters. The lazy child could produce a standard birthday

→

By ROGER FROST

From Page 29

thank you letter and then make small alterations to suit each individual.

Most youngsters love making lists of things and are quite happy to type them on the computer.

Anything that encourages a child to write will improve his or her language skills and so could be a benefit when it comes to exams or job applications.

But what software is available for the Electron? Well, a number of software houses do produce suitable packages.

Database Publications produce Mini Office, an excellent and cheap package for cassette-based machines. Kansas also produce a tape program offering rather more features.

If you own a Plus 1 you have access to View from Acornsoft which comes in a cartridge and leaves more computer memory for text. It is a sophisticated and fairly expensive package.

Editing with View

If you have the ability to add sideways ROMs to your Electron (various products are advertised in *Electron User*) then more choices are available for you.

Starword from Slogger is, like View, a professional product but perhaps rather easier to use.

Like any ROM package it is fairly expensive, but still represents good value for anyone likely to use a word processor regularly.

Also available in ROM form, and very useful to pupils because many schools use it, is Edword.

This BBC package from Clwyd Technics was designed specifically for use in schools.

It has many high quality features, is easy to use, but comes with a high price tag.

This is not a comprehensive list of all word processors for the Electron. With the kind of support the machine now gets from software houses more can be expected.

There may also be others on the market that I don't know of. They are complex pieces of software so I would buy one from a reputable and well known publisher.

That just about wraps up the word processor – the ideal first piece of educational software.

In future issues we'll look at learning programs, computers and primary children, and learning to program.

● *Next month we'll deal with the second most used type of program in school – the database.*

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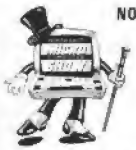

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CROCODILE TEARS

By ANDREW & STEPHEN WEIR

WITH a hungry crocodile in front of him and a brick wall behind Jeremy has nowhere to go. His only chance of survival is to knock down the wall, one brick at a time.

But there is a word between Jeremy and the crocodile and to stop the crocodile eating Jeremy you must fill in the missing letter.

If you can't complete the word within three goes the crocodile will eat him up.

If you do complete the word Jeremy has time to knock a brick off the wall.

Once he has knocked all 10 bricks off he is free to run away.

There are eight letters to choose from. Only one will fit the word. To choose a letter move the arrow using the spacebar until it is positioned above the letter that you think is correct. Then press Return.

If you were correct a brick will be knocked off the wall – if not, the crocodile will move even closer.

Once the game has ended answer the question Another game? by pressing Y for yes, or N for no.

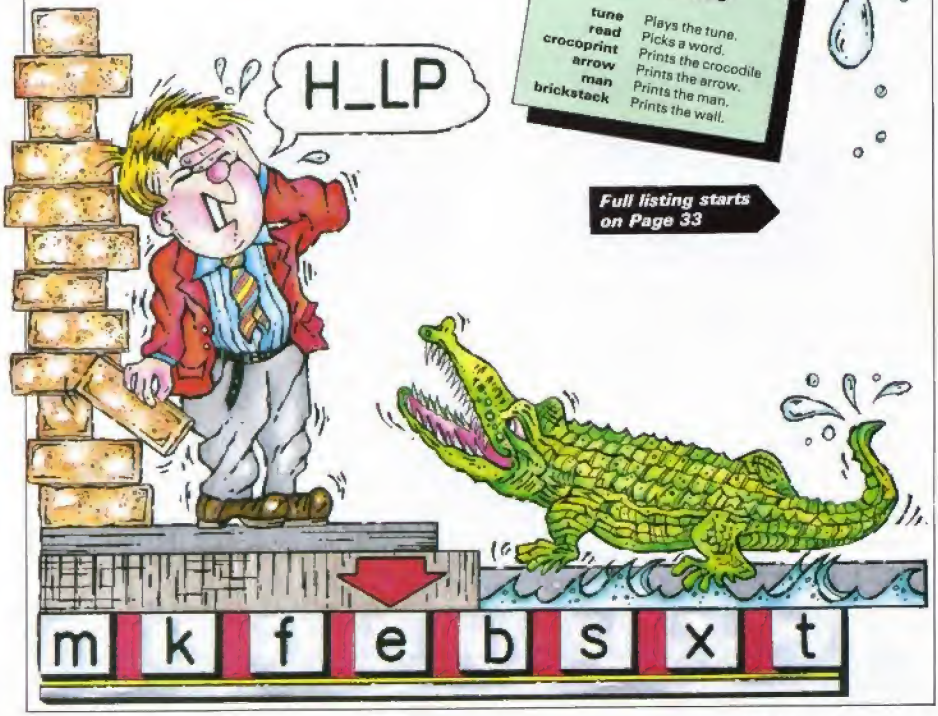
Pressing Y will advance you to the next level – there are seven in all – unless you failed to save Jeremy, in which case that level will be replayed.

If you press N the game will restart, ready for another player.

PROCEDURES

tune	Plays the tune.
read	Picks a word.
crocoprint	Prints the crocodile
arrow	Prints the arrow.
man	Prints the man.
brickstack	Prints the wall.

Full listing starts on Page 33



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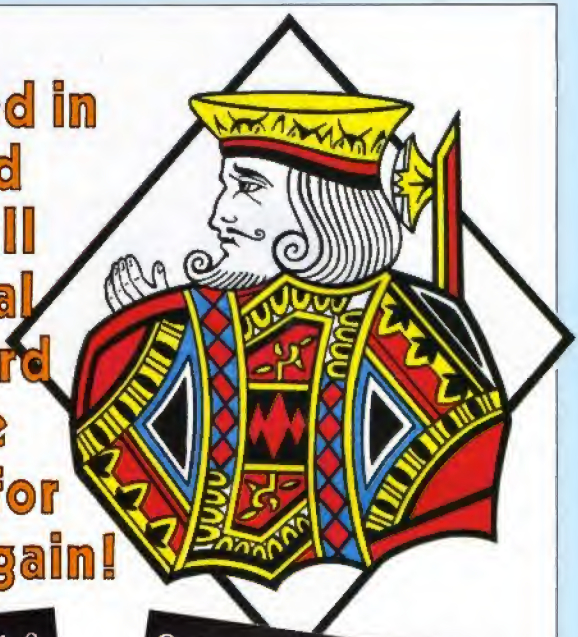

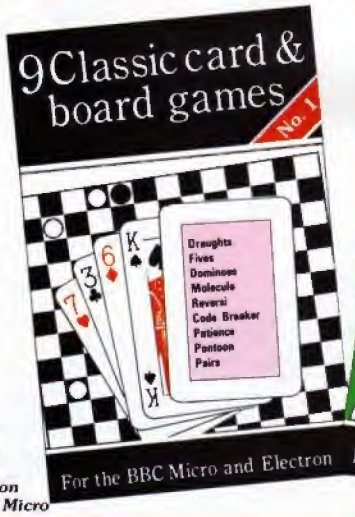

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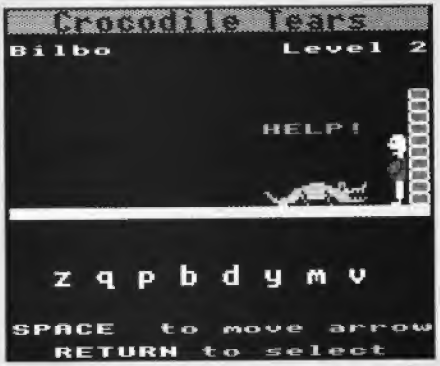
TO ORDER, PLEASE USE THE FORM ON PAGE 61

From Page 31

```
  10 REM Crocodile Tears
  20 REM By S & A Weir
  30 REM (c)Electron User
  40 IF PAGE>&E00 GOTO890
  50 GOSUB 60:GOSUB 380:RU
N

  60 VDU23,138,0,0,0,96,48
,29,15,3,23,131,0,1,15,38,6
3,253,248,192,23,132,63,255
,255,255,127,127,128,64,23,
133,7,229,253,127,191,79,71
,32,23,134,1,3,198,234,128,
213,254,0,23,155,126,129,12
9,129,129,129,129,126:*FX22
6

  70 VDU23,156,85,170,85,1
70,85,170,85,170,23,135,60,
126,94,254,126,14,60,12,23,
136,14,56,122,250,246,78,12
6,62,23,137,28,28,28,28,28,
28,8,128,23,138,16,16,16,16
,254,124,56,16:*FX11

  80 ON ERROR IF ERR=17 RU
N ELSE MODE6:REPORT:PRINT"
at line ";ERL:END

  90 MODE2:*FX4,2

 100 *FX202,0,100

 110 *FX10,100

 120 *FX227

 130 VDU23;8202;0;0;0;:hei
ghtI=18:*FX225

 140 RESTORE160:DIM Words$(
10):oswrch=&FFEE:osword=&FF
F1:PROCassemble:Name$=FNnam
e:LevelI=1:ENVELOPE2,2,1,-1
,1,2,4,2,126,0,0,-126,126,1
26

 150  VDU 23,148,170,85,17
0,85,170,85,170,85:CLS:VDU2
3;8202;0;0;0;:RETURN

 160  DATA 68,68,52,48,48,
32,48,20,68,68,32,48,48,32,
48,68,88,88,72,68,68,52,68,
48,88,88,72,68,68,52,68,56,
68,64,68,72,68,72,96,100,96
,100,68,72,96,100,68,72,-9

 170 DATA 68,68,52,52,0,52
,32,88,72,68,68,52,52,0,52,
52,100,96,88,88,0,88,88,0,8
8,96,100,88,88,88,68,68,0,6
8,68,100,96,88,88,100,88,68
,0,68,68,68,52,52,48,48,0,
48,48,68,68,52,52,48,48,0,4
8,48,52,68,68,68,68,52,68,6
8,68,52,68,68,68,32,32,0,32,32
,88,72

 180 DATA 68,68,52,52,0,52
,32,88,72,68,68,52,52,0,52,
52,100,96,88,88,0,88,88,0,8
8,96,100,88,88,88,68,68,0,6
8,68,100,96,88,88,100,88,68
,0,68,68,68,52,52,48,48,0,
48,48,68,68,52,52,48,48,0,4
8,48,52,68,68,68,68,52,68,6
8,68,52,68,68,68,32,32,0,32,32
,88,72

 190 DATA about,after,arou
nd,coming,large,next,people
,pretty,should,sister,summe
r,something,teacher,their,t
hen,there,think,things,thro
ugh,today,wanted,write,here
,mother,father,who,shift,lo
ck,"END"

 200  DATA across,air,aunt
,apple,autumn,beautiful,beh
ind,birthday,bought,built,c
alling,christmas,cousin,col
our,daisy,different,dress,e
ating,enough,even,family,fl
ower,fortune,grandmother,ha
ppen,"END"

 210 DATA against,already,
arrive,basket,beginning,big
gest,breakfast,business,cap
tain,climb,coloured,countri
es,crying,digging,doctor,fe
tch,english,favourite,frigh
tened,glass,goal,hardly,som
ewhere,"END"

 220 DATA ahead,base,baske
tball,beside,below,branch,c
apital,chimney,citizen,clot
hing,dental,disease,downsta
irs,especially,february,han
dkerchief,headmaster,july,k
nock,leader,longer,"END"

 230 DATA absent,aircraft,
assembly,blanket,bulldozer,
canary,contest,dangerous,di
ctionary,electricity,empty,
footpath,forgotten,garage,g
ift,government,hanger,healt
h,honour,husband,juice,lang
uage,lazy,"END"

 240 DATA account,agreemen
t,apron,avenue,bathing,butt
erfly,carpenter,comfortable
,costume,disappoint,exciten
t,forward,furniture,immed
iately,lightning,machinery,
neighbourhood,plantation,pr
otection,settlement,smooth,
transport,umbrella,"END"

 250 DATA acquainted,backw
ards,boundary,equipment,gra
dually,independence,photogr
aphy,production,refreshment
s,shepherd,stationary,throu
ghout,understood,variety,wh
eelbarrow,whatever,width,wr
eath,zebra,zero,tongue,tra
veller,"END"

 260 DEFPROCDBLM(Lev$,xI,y
I):PRINTTAB(xI,yI);:FORCHI=
1TO LEN Lev$:AI=ASC MID$(Le
v$,CHI,1):CALLd:NEXT:ENDPRO
C

 270 DEFPROCDBL(Lev$):FORC
HI=1TO LEN Lev$:AI=ASC MID$
(Lev$,CHI,1):CALLd:NEXT:END
PROC

 280 DEFPROCassemble DIMMC
I89:FORII=0TO2STEP2:PI=MCI:
[OPTII,d STAb:LDA@18:LDI%b
 AND255:LDY%b DIV256:JSRosw
rch:LDA@8:STAJx.d1 LDA&23:J
SRoswrch:LDAj:DRA#224:JSRos
wrch:LDAj:ASLA:ASLA:TAX:LDY
04:.d2 INX:LDAb,I:JSRoswrch
:JSRoswrch:DEY:BNEd2:INCj

 290 LDAj:CMP#2:BNEd1:LDI@
4:.d3 LDAs,X:JSRoswrch:DEI:
BPLd3:RTSi.b1]:j=b+9:s=j+1:
$s=CHR$11+CHR$225+CHR$8+CHR
$18+CHR$224:NEXT:ENDPROC

 300 DEFFNname:CLS:COLOUR7
:PROCDBLM("Crocodile Tears"
,2,3):COLOUR6:PROCDBLM("Ent
er your",5,8):COLOUR3:PROCD
BLM("name",8,11):COLOUR5:PR
OCDBLM("and  press",5,14):C
OLOUR1:PROCDBLM("RETURN",7,
17):COLOUR3:PRINT TAB(2,29)
;"Press";:COLOUR7

 310 PRINT" DELETE ";:COLO
UR 3:PRINT"for"'TAB(4);"a
correction";:COLOUR2:Name$=
"":PRINTTAB(4,23);:*FX15,1

 320 REPEAT upX=INKEY(0):P
ROCtune(1):IF upX)31 AND up
X<127 AND POS<16 THEN VDU u
pX:Name$=Name$+CHR$(upX)

 330 IF upX=127 AND LEN Na
me$ Name$=LEFT$(Name$,LEN N
ame$-1):IF POS)3 VDUupX

 340 UNTIL upX=13:=Name$

 350 DEFPROCtune(upX):READ
 piX:IF piX<0 AND upX()3 RE
STORE 160:READ piX ELSE IF
 piX<0 AND upX=3 THEN RESTOR
E 170:READ piX

 360 IF upX=1 THEN SOUND1,
-10,piX+15,3 ELSE IF upX=2
THEN SOUND1,2,piX,10  ELSE
 IF piX=0 THEN SOUND1,0,0,1
ELSE SOUND1,-10,piX+(10-Bri
cksX*4),3

 370 ENDPROC

 380 PROCsetup:REPEAT PROC
init:REPEAT:PROCrnd:PROCpri
nt:completed=FNchoice:IF co
mpleted=TRUE PROCcorrect EL
SE PROCwrong

 390 UNTIL LivesX=0 OR Bri
cksX=0:PROCending:UNTIL FNa
gain=FALSE

 400 DEFPROCsetup COLOUR 0
:COLOUR135:PRINT'STRING$(40
,CHR$140);:VDU5:GCOL 0,0:MO
VE 130,1019-32:PROCDBL("Cro
codile Tears"):VDU4

 410 COLOUR128:COLOUR6:PRI
NT'Name$;:COLOUR3:PRINTTAB(
13);"Level ";:COLOUR7:PRINT
TAB(19);LevelI
```



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What your Electron Communications Pack will contain:

★ **The Protek 1200 Modem.** This is an accoustic modem that can be used with any standard rotary dial or push button telephone, apart from Trimphones and non-standard specialist phones. It operates in two modes – 1200/75 full duplex and 1200/1200 half duplex.

★ **The Electron interface.** This is the link between the modem and your computer and fits into the cartridge slot of the Electron's Plus 1. It also provides you with a standard RS423 outlet which you can use to connect your Electron to any serial printer – or to another computer.

★ **Commstar communications software.** This is an enhanced version of the BBC Micro's best-selling Comstar. It comes on a 16k eprom which is already fitted into the interface. It combines viewdata and Ascii communications software that enable you to connect directly to Prestel, MicroLink, Telecom Gold and other databases. While only available in monochrome it contains all the other features expected of advanced communications software.

The pack comes with detailed manuals giving you a helpful introduction to all aspects of communications.

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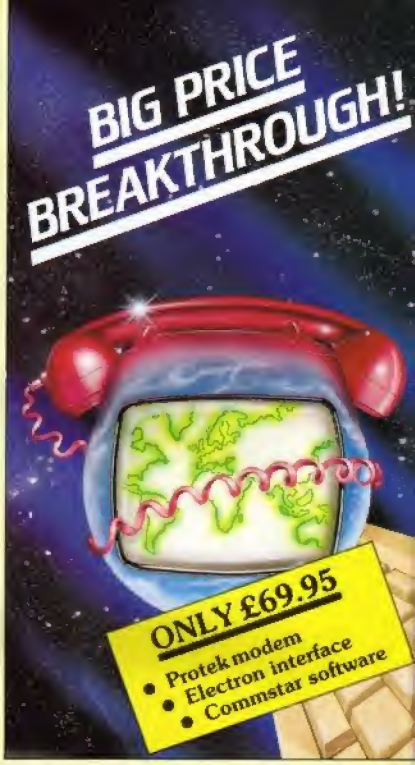
Normal price £91.95 incl. VAT. **YOU SAVE £22**

Plus FREE registration to MicroLink TELECOM GOLD

NOTE: You will also need a Plus 1 – not included in this package



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I wish to pay by:

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( ) Access/Barclaycard No.

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Name .....

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.....

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Send to: **Protek Offer, Electron User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.**

Allow up to 28 days for delivery.

Crocodile Tears listing

From Page 33

```
  420 COLOUR2:COLOUR135:PRI
NTTAB(0,height%);STRING$(20
,CHR$140);COLOUR128:PROCaan
(18):ENDPROC
  430 DEFPROCaan(up%):COLOU
R7:PROCDBLM(CHR$135,up%,hei
ght%-6):COLOUR1:PROCDBLM(CH
R$136,up%,height%-4):COLOUR
3:PROCDBLM(CHR$137,up%,heig
ht%-2):ENDPROC
  440 DEFPROCinit:PROCresto
re:up%=0:REPEAT:PROCread:IF
 RND(18)>7 up%=up%+1:Word$(
up%)=Lev$
  450 UNTILup%=10:Bricks%=1
0:Lives%=3:wrong=FALSE:COLO
UR7:PRINTTAB(8,28)"SPACE  "
;:COLOUR5:PRINT"to move arr
ow":COLOUR7:PRINT"  RETURN
 ":COLOUR5:PRINT"to select"
:ENDPROC
  460 DEFPROCread READ Lev$
:IF Lev$="END" THEN PROCres
tore:READ Lev$
  470 ENDPROC
  480 DEFPROCrestore:IF Lev
el%=1 RESTORE 190 ELSE IF L
evel%=2 RESTORE 200 ELSE IF
 Level%=3 RESTORE 210 ELSE
IF Level%=4 RESTORE 220 ELS
E IF Level%=5 RESTORE 230 E
LSE IF Level%=6 RESTORE 240
 ELSE IF Level%=7 RESTORE 2
50
  490 ENDPROC
  500 DEFPROCrnd:IF wrong=F
ALSE pos%=RND(LENWord$(Bric
ks%)):Letter$=MID$(Word$(Br
icks%),pos%,1):Number%=RND(
8):IF Bricks%()10 Word$(Bri
cks%+1)=""
  510 ENDPROC
  520 DEFPROCcrocoprint:up%
=(20-(LENWord$(Bricks%)+3)-
(Lives%-1)-1)-5
  530 COLOUR128:COLOUR2:A$=
"          "+CHR$130+CHR$1
31+CHR$132+CHR$133+CHR$134:
PROCDBLM(RIGHT$(A$,20-LENWo
rd$(Bricks%)-3-(Lives%-1)),
8,height%-2):&COL 8,8:PLOT
69,((up%+5)*64)-12,((32-(he
ight%-2))*32)-16:ENDPROC
  540 DEFPROCbrickstack:COL
OUR129:COLOUR7:FOR up%=1 TO
 Bricks%:PRINTTAB(19,height
%-up%);CHR$251:NEXT:COLOUR1
28:PRINTTAB(19,height%-up%)
;SPC1:SOUND0,-10,7,2:ENDPRO
C
  550 DEFPROCprint:PROCcroc
oprint:IF wrong=TRUE THEN E
NDPROC
  560 COLOUR3:FOR up%=1 TO
8:IF up%=Number% THEN PROCD
BLM(Letter$,up%*2,height%+5
) ELSE REPEAT:Lev$=CHR$(RND
(26)+96):UNTILLev$()Letter$
:PROCDBLM(Lev$,up%*2,height
%+5)
  570 NEXT:PROCbrickstack
  580 COLOUR7:FOR up%=1 TO
LEN Word$(Bricks%):Lev$=MID
$(Word$(Bricks%),up%,1):IF
up%=pos% THEN Lev$="_"
  590 PROCDBLM(Lev$,16-LENW
ord$(Bricks%)+up%,height%-2
):NEXT:ENDPROC
  600 DEFFNchoice *FX15,1
  610 Across%=2:REPEAT:PROC
arrow(Across%):REPEAT:key%=
GET:UNTILkey%=32 OR key%=13
:IFkey%=32 PROCdelarrow(Acr
oss%):Across%=Across%+2:IF
Across%=18 Across%=2
  620 UNTILkey%=13:IF Acros
s%/2=Number% THEN up%=TRUE
ELSE up%=FALSE
  630 =up%
  640 DEFPROCarrow(up%):COL
OUR6:PROCDBLM(CHR$138,up%,h
eight%+2):ENDPROC
  650 DEF PROCdelarrow(up%)
:PROCDBLM(" ",up%,height%+2
):IF key%=32 SOUND1,-10,100
,1:SOUND1,-10,116,1:SOUND1,
-10,128,1:*FX15,1
  660 ENDPROC
  670 DEFPROCdelline:COLOUR
128:FOR up%=height%-1 TO he
ight%-2 STEP-1:PRINTTAB(0,u
p%);SPC18:NEXT:ENDPROC
  680 DEF PROCcorrect:COLOU
R7:PROCDBLM(Word$(Bricks%),
17-LENWord$(Bricks%),height
%-2):RESTORE170:FOR up%=1 T
O 16:PROCtune(3)
  690 NEXT:TIME=0:REPEATUNT
ILTIME>200:Bricks%=Bricks%-
1:PROCdelarrow(Across%):IF
Bricks%)0 PROCdelline
  700 wrong=FALSE:ENDPROC
  710 DEF PROCwrong Lives%=
Lives%-1:wrong=TRUE
  720 RESTORE160:FOR up%=1
TO 7:PROCtune(2):*fx15,1
  730 NEXT:TIME=0:REPEATUNT
ILTIME>400:PROCdelarrow(Acr
oss%):ENDPROC
  740 DEFPROCending:IF Live
s%=0 PROCdead ELSE PROCruna
way
  750 ENDPROC
  760 DEFPROCdead:X%=Word$(
Bricks%):FOR I%=LENWord$(Br
icks%) TO 2 STEP-1:TIME=0:R
EPEATUNTILTIME>100:Word$(Br
icks%)=RIGHT$(Word$(Bricks%
),I%):PROCcrocoprint:SOUND0
,-10,4,3:NEXT:PROCfinishoff
:COLOUR128:FORup%=height%-6
 TO height%-3
  770 PRINTTAB(18,up%)SPC1:
NEXT:COLOUR 5:PROCDBLM(Name
$,(20-LENName$)DIV2,8):COLO
UR1
  780 PROCDBLM("the word wa
s",4,11):COLOUR8
  790 PROCDBLM(X$,(20-LENX$
)DIV2,14):RESTORE160:ENDPRO
C
  800 DEFPROCfinishoff:A$="
"+CHR$130+CHR$131+CHR$132+
CHR$133+CHR$134:&COL0,8:FOR
 up%=1 TO 13:TIME=0:REPEAT
UNTIL TIME>100:COLOUR2:PRO
CDBLM(A$,up%,height%-2):PLO
T 69,((up%+5)*64)-12,((32-(
height%-2))*32)-16:VDU17,8
  810 PRINTTAB(12,height%-7
);"HELP!":SOUND0,-18,4,3:NE
XT:PRINTTAB(12,height%-7);S
PC5:ENDPROC
  820 DEFPROCrunaway:PRINTT
AB(19,height%-1);SPC1:FOR s
teps%=18 TO 19:PROCaan(step
s%):SOUND1,-10,100,2:TIME=0
:REPEATUNTIL TIME>200:FOR u
p%=height%-1 TO height%-6 S
TEP-1:PRINTTAB(steps%,up%);
SPC1
  830 SOUND1,-10,((up%-heig
ht%+2)*30)+100,1:NEXT:NEXT:
COLOUR14:PROCDBLM("* CONGRA
TULATIONS! *",8,7):RESTORE1
70:ENDPROC
  840 DEF FNagain:VDU28,0,3
1,19,19:CLS:VDU26:COLOUR 3:
PROCDBLM("Another game ",4,
26):COLOUR 7:PROCDBLM("Yes
or No?",5,29):REPEAT:IF Liv
es%=0 PROCtune(2) ELSE PROC
tune(3)
  850 input$=INKEY$(1):UNTI
L input$="Y" OR input$="N":
PROCwipe:IF input$="Y" THEN
 PROCaan(18):IF Lives%()0 L
evel%=Level%+1:IF Level%)7
Level%=7
  860 *FX15
  870 IF input$="Y" COLOUR
7:PRINTTAB(19,4):Level%:=TR
UE ELSE =FALSE
  880 DEF PROCwipe:PRINT TA
B(0,26);SPC100:FORup%=heig
ht%-1 TO 6 STEP-1:PRINTTAB(
0,up%)SPC20:NEXT:ENDPROC
  890 *KEY0 *T.!MFOR1%=PAGE
 TO TOP STEP4:!(1%-0%)=!1%:
NEXT:!(TOP-0%)=&FF0D:PAGE=&
E00:HOLD:MRUN!M
  900 0%=PAGE-&E00:*FX138,0
,120
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

HARDWARE SURVEY

A round-up of some of the popular add-ons available to expand your Electron

Maker	Price	Description
ACP *6 Ava House,* *High Street,* *Chobham,* *Surrey.* *GU24 8LZ.* *Tel: 0276 76545*	£10.35 (1 socket) £14.95 (2 sockets) £69.55 N/A	**ROM Adapter Board I** A single ROM board for insertion into the Plus 1 cartridge slot. **ROM Adapter Board II** A two ROM version with special zero profile sockets allowing two 8k or 16k ROMs to be on line and instantly available. **AP4 Disc Interface** Fully Acorn compatible disc interface that accepts standard 5¼ or 3½in drives with PSU. **AP5 Interface** Triple interface cartridge comprising user port, 1Mhz bus and Tube interface allowing use of Mouse, eprom programmer and Acorn second processors. Plugs into the Plus 1.
Andyk *29 Station Road,* *Wesham,* *Lancs.* *PR4 3AR.* *Tel: 0772 684573*	£9.99 £34.99	**Eprom Cartridge** Allows ROM-based utility programs or games to be used with the Electron. **RS423 Interface Card** A general serial interface for communication and driving a serial printer.
Cumana *Pines Trading Estate,* *Broad Street,* *Guildford.* *GU3 3BH.* *Tel: 0483 503121*	£69.00	**Disc Interface** Consists of an interface cartridge that accepts standard 5¼ or 3½in drives with PSU.
Expandor Systems *99 Staley Hall Road,* *Stalybridge,* *Cheshire. SK15 3DP.* *Tel: 061-303 7646*	£14.95, £24.45 for two	**Eprom Plus ROM Card** Supports up to four ROMs in any combination of 2764 (8k) or 27128 (16k).
First Byte *10 Castlefields Main Centre,* *Derby. DE1 2PE.* *Tel: 0332 365280*	£19.95	**Joystick Interface** Plugs into the Electron's edge connector for use by one switched joystick.
Morley Electronics *1 Morley Place,* *Shiremoor,* *Tyneside. ME27 0QS.* *Tel: 091-251 3883*	£149.95	**Teletext Adapter** Connects via the Plus 1 interface and allows access to all normal teletext facilities, plus free downloadable telesoftware.
Mushroom Computers *Unit 3C,* *Aston Road, Bedford.* *Tel: 0234 58303*	£29.95	**Sideways ROM Card** Four ROM capacity, plugs into the Electron's extension port without modification.

Maker	Price	Description
Mushroom Computers *Unit 3C,* *Aston Road,* *Bedford.* *Tel: 0234 58303*	£39.95	**Printer Interface and User Port** Fully centronics compatible and designed to permit future expansion, the card comes complete with printer driver software and a screen dump routine.
Nidd Valley *Freepost, Knaresborough,* *W. Yorks. HG5 8YZ.* *Tel: 0438 864888*	£14.95	**Slomo Interface** Plugs into the Electron's edge connector and allows you to slow down and freeze screen action.
Pace *Juniper View,* *Allerton Road,* *Bradford.* *BD15 7AG.* *Tel: 0274 488211*	Special offer £119 (normally £139)	**Nightingale Modem + Tellstar** Communications package including intergrated RS423 interface and combined viewdata and Ascii communications software that fits into the Plus 1.
Slogger *107 Richmond Road,* *Gillingham,* *Kent.* *Tel: 0634 52303*	£44.95	**ROMbox** Allows you to run ROM software by providing sockets for eight ROMs (8k or 16k), but user selectable options also enable 4k ROMs and the RAMboard to be used. Compatible with Plus 1 and Plus 3.
	£69.95	**ROMbox (P)** In addition to all the features on the original, the P version has user selection for 8k RAMs, or 16k with the Sideways RAMboard and integral parallel printer interface.
	Kit £29.95 (£42 in-house installation)	**Turbo Driver** Enables the Electron to run at a speed comparable with the BBC Micro. Fits into the ULA and Basic ROM sockets.
	£29.95	**Sideways RAM Board** Plugs into ROMbox socket and uses two 8k static RAM chips allowing full 16k sideways RAM capacity.
Voltmace *Park Drive,* *Baldock,* *Herts.* *SG7 16EW.* *Tel: 0462 894410*	£12	**Single Plus 1 Joystick Delta 3B** A single analogue joystick that plugs into the Plus 1.
	£19.95	**Twin Plus 1 Joystick Delta 3B** A double analogue joystick that plugs into the Plus 1.
Wigmore House *32 Saville Row,* *London.* *W1X 1AG.* *Tel: 01-734 0173*	£24.90	**Trackball** Basically an alternative to an analogue joystick and for some applications much easier to handle.
	£69.90	**Tarantula Touch Tablet** A graphics package that work in a similar way to a lightpen except that the tablet takes place of monitor.
Wizard Systems *Alpha House,* *10 Carver Street,* *Sheffield.* *S1 4FS.* *Tel: 0742 752912*	£39.95	**Sidewinder ROM board and joystick interface** Combines four sideways ROM sockets, joystick interface and programmable joystick ROM.

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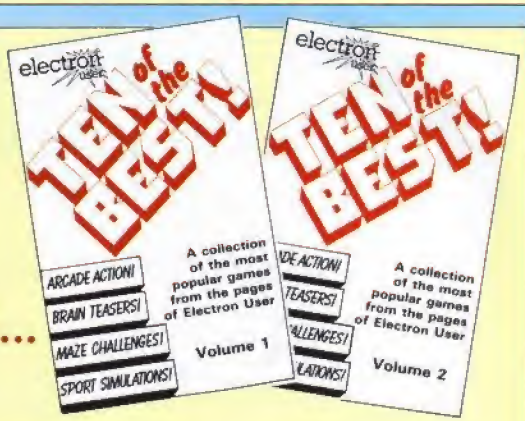

These two cassettes are not only crammed with 18 of the best games from the early days of Electron User. At no extra expense, we've included on each an unpublished Roland Waddilove machine code masterpiece as a freebie. Roland's Jam Butty and Atom Smash are arcade action at its fastest and most frustrating. And they're only available with Ten of the Best. So give yourself a treat ... with the most popular cassettes we've ever produced.

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Attack the bandit ships in this fast-moving 3D punch-up.

TO ORDER, PLEASE USE THE FORM ON PAGE 61

ZAP

By PHILIP CLARKSON

JUST when you thought it was safe to have a quite snooze out pops an alien fleet from hyperspace.

As the numbers increase the outlook is bleak.

The population is depending on you to defend the Earth from these marauding aliens. Are you up to the task?

Although you're outnumbered you are equipped with a super zap gun. A quick blast on this is enough to dispose of an alien invader.

As if this weren't difficult enough, in the later stages of the game you'll have to dodge asteroids.

PROCEDURES

game	Main loop.
set_var	Sets variables for game.
move_you	Moves you.
check	Checks if you have been hit.
mov e_bomb	Moves bomb.
move_alien	Moves alien.
complete	Routine for changing screen.
dead	Routine for losing life.
in_top_five	End of game routine.
meteor	Produces meteor.

VARIABLES

AF%(n)	True if alien has been shot.
AM%	Number of alien to move next.
AX%(n)	X position of alien.
AY%(n)	Y position of alien.
BOMB%	True if bomb has been fired.
BX%	X position of bomb.
BY%	Y position of bomb.
COM%	True if screen is complete.
D%	Direction of bomb.
DEAD%	True if you are dead.
GAMEOVER	True if the game is over.
L%	Level you are in.
LEV%	Level you are on (always less than 21).
LV%	X position of meteor.
MX%	Y position of meteor.
NO%	Number of aliens at start of screen.
SC%	Your score.
TYP%	Type of alien.
X%	Your X position.
Y%	Your Y position.

Keys:

Z = Left X = Right
* = Up / = Down
Return = Fire

Full listing starts on Page 42

From Page 41

```
  10 REM Zap
  20 REM By Philip Clarkso
n
  30 REM (c) Electron User
  40 REM
  50 ON ERROR GOTO 2750
  60 MODE4
  70 VDU23;8202;0;0;0;
  80 PROCinit
  90 PROCinstructions
 100 MODE5
 110 VDU23;8202;0;0;0;
 120 PROCgame:MODE4
 130 VDU23;8202;0;0;0;
 140 PROCin_top_five
 150 GOTO 90
 160 DEFPROCinit
 170 DIM HI$(6),HIX(6),AIX
(19),AYX(28),AFX(5)
 180 VDU23,224,24,24,24,60
,60,126,126,255
 190 VDU23,225,255,126,126
,60,60,24,24,24
 200 VDU23,226,128,224,248
,255,255,248,224,128
 210 VDU23,227,1,7,31,255,
255,31,7,1
 220 VDU23,228,129,66,126,
219,255,126,66,195
 230 VDU23,229,129,66,36,1
26,219,126,36,195
 240 VDU23,230,231,24,60,9
8,255,102,60,195
 250 VDU23,231,60,24,126,9
8,255,102,255,129
 260 VDU23,232,24,24,24,24
,24,24,24,24
 270 VDU23,233,0,0,0,255,2
55,0,0,0
 280 VDU23,234,170,85,170,
85,170,85,170,85
 290 VDU23,235,24,60,126,2
55,255,126,60,24
 300 HI$(1)="SuperMe":HI$(
2)="lamace":HI$(3)="Meagain
"
 310 HI$(4)="Superman IV":
HI$(5)="Kilroy"
 320 FORI=1 TO 5:HIX(I)=(6
0-(I*10))*10:NEXT
 330 ENVELOPE1,1,10,5,2,10
0,100,100,126,0,0,-126,126,
126
 340 ENVELOPE2,0,127,127,1
27,255,255,255,126,0,0,-126
,126,126
 350 *FX9,1
 360 *FX10,1
 370 ENDPROC
 380 DEFPROCinstructions
 390 VDU19,0,4,0,0,0
 400 ?&D3=255
 410 PROCcentral("ZAP",1)
 420 ?&D3=0:FORI%=1 TO 4
 430 A$=CHR$(IX+227)+"
"+STR$(II%10)
 440 PROCcentral(A$,(I%+3)
*7)
 450 NEXT
 460 PROCcentral("Z-left
 X-right",24)
 470 PROCcentral("*-up
/-down",26)
 480 PROCcentral("RETURN-f
ire",28)
 490 PROCcentral("SPACE to
 start",30)
 500 PROCscroll("Zap the a
liens before they ram you..
....",0,5,1500)
 510 IF FX=TRUE THEN ENDPR
OC
 520 CLS
 530 FORIX=1 TO 5
 540 PRINTTAB(5,IX+5),HI$(
IX);TAB(30);HIX(IX)
 550 NEXT
 560 PROCcentral("SPACE to
 start",30)
 570 PROCscroll("ZAP hi-sc
ores...",12,1,1500)
 580 IF FX=TRUE THEN ENDPR
OC
 590 CLS:GOTO400
 600 DEFPROCcentral(Y$,ZX)
 610 PX=20-(LEN(Y$)/2)
 620 PRINTTAB(PX,ZX);Y$
 630 ENDPROC
 640 DEFPROCscroll(X$,XX,Y
X,TX)
 650 TIME=0
 660 REPEAT
 670 X$=RIGHT$(X$,LEN(X$)-
1)+LEFT$(X$,1)
 680 PRINTTAB(XX,YX);X$
 690 FOR I=1 TO 50:NEXT
 700 FX=INKEY-99
 710 UNTIL TIME)TX OR FX=T
RUE
 720 ENDPROC
 730 DEFPROCgame
 740 PROCset_var
 750 PROCset_screen
 760 TYPX=INT(LEVX/5-0.2)+
1
 770 NOX=LEVX-((TYPX-1)*5)
 780 FOR IX=1 TO NOX:AFX(I
X)=FALSE:NEXT
 790 PROCset_aliens
 800 REPEAT
 810 AMX=AMX+1:IF AMX)NOX
THEN AMX=1
 820 PROCmove_you
 830 PROCmove_bomb
 840 PROCmove_alien
 850 PROCmove_bomb
 860 IF LX)20 AND RND(175-
LX)<2 THEN PROCmeteor
 870 UNTIL COMX OR DEADX
 880 IF COMX THEN PROCcomp
lete:GOTO 750 ELSE PROCdead
 890 IF GAMEOVERX THEN END
PROC ELSE GOTO 750
 900 DEFPROCset_var
 910 NAME$="":SCX=0:AMX=0:
LEVX=1:LX=1:LVX=3:COMX=FALS
E:DEADX=FALSE:GAMEOVERX=FAL
SE:BOMBX=FALSE
 920 VDU19,1,2,0,0,0,19,3,
4,0,0,0
 930 ENDPROC
 940 DEFPROCset_screen
 950 COLOUR131
 960 VDU28,0,31,19,29:CLS
 970 COLOUR2:PRINT"SCORE
";SCX;TAB(15);STRING$(LVX,C
HR$224);
 980 COLOUR128
 990 XX=10:YX=14:DIRX=1
1000 VDU26
1010 PRINTTAB(5,16);"SCREE
N ";LX
1020 PRINTTAB(XX,YX);CHR$2
24
1030 ENDPROC
1040 DEFPROCset_aliens
1050 TIME=0
1060 FORIX=1 TO NOX
1070 AIX(IX)=RND(20)-1:PRO
Ccheck_x
1080 IF FGX=FALSE THEN 107
0
1090 AYX(IX)=RND(29)-1:PRO
Ccheck_y
1100 IF FGX=FALSE THEN 109
0
1110 NEXT
1120 REPEAT UNTIL TIME)200
1130 PRINTTAB(5,16);STRING
$(10," ")
1140 ENDPROC
1150 DEFPROCcheck_x
1160 FGX=FALSE
1170 IF (TYPX=1 OR TYPX=3)
 AND (AIX(IX)=0 OR AIX(IX)=
19) THEN FGX=TRUE
1180 IF (TYPX=2 OR TYPX=4)
 AND (AIX(IX)<5 OR AIX(IX))
14) THEN FGX=TRUE
1190 ENDPROC
1200 DEFPROCcheck_y
1210 FGX=FALSE
1220 IF TYPX=1 OR TYPX=3 T
HEN FGX=TRUE
1230 IF (TYPX=2 OR TYPX=4)
 AND (AYX(IX)<9 OR AYX(IX)>
19) THEN FGX=TRUE
1240 ENDPROC
1250 DEFPROCmove_you
1260 COLOUR2
1270 IF INKEY-98 THEN PROC
left
1280 IF INKEY-67 THEN PROC
right
1290 IF INKEY-73 THEN PROC
up
1300 IF INKEY-105 THEN PRO
Cdown
1310 IF INKEY-74 THEN PROC
fire
1320 IF DIRX=1 THEN PRINTT
AB(XX,YX);CHR$224 ELSE IF D
IRX=2 THEN PRINTTAB(XX,YX);
CHR$226 ELSE IF DIRX=3 THEN
 PRINTTAB(XX,YX);CHR$225 EL
SE IF DIRX=4 THEN PRINTTAB(
XX,YX);CHR$227
1330 PROCcheck
1340 ENDPROC
1350 DEFPROCleft
1360 DIRX=4:PRINTTAB(XX,YX
);" "
1370 IF XX)0 THEN XX=XX-1
1380 ENDPROC
1390 DEFPROCright
1400 DIRX=2:PRINTTAB(XX,YX
);" "
1410 IF XX<19 THEN XX=XX+1
1420 ENDPROC
1430 DEFPROCup
1440 DIRX=1:PRINTTAB(XX,YX
);" "
```

```
1450 IF YX)0 THEN YX=YX-1
1460 ENDPROC
1470 DEFPROCdown
1480 DIRX=3:PRINTTAB(XX,YX
);" "
1490 IF YX<28 THEN YX=YX+1
1500 ENDPROC
1510 DEFPROCfire
1520 IF BOMBX=TRUE THEN EN
DPROC
1530 BOMBX=TRUE:DX=DIRX:BX
X=XX:BYX=YX
1540 SOUND1,1,75,3
1550 ENDPROC
1560 DEFPROCcheck
1570 FORKX=1 TO NOX
1580 IF AXX(KX)=XX AND AYX
(KX)=YX AND AFX(KX)=FALSE T
HEN DEADX=TRUE
1590 NEXT
1600 ENDPROC
1610 DEFPROCmove_bomb
1620 IF BOMBX=FALSE THEN E
NDPROC
1630 COLOUR2
1640 IF DX=1 THEN PROCbomb
_up ELSE IF DX=2 THEN PROCb
omb_right ELSE IF DX=3 THEN
 PROCbomb_down ELSE PROCbom
b_left
1650 ENDPROC
1660 DEFPROCbomb_up
1670 PRINTTAB(BXX,BYX);" "
:BYX=BYX-1:IF BYX<0 THEN BO
MBX=FALSE:ENDPROC
1680 PRINTTAB(BXX,BYX);CHR
$232
1690 PROCcheck_bomb
1700 ENDPROC
1710 DEFPROCbomb_right
1720 PRINTTAB(BXX,BYX);" "
:BXX=BXX+1:IF BXX)19 THEN B
OMBX=FALSE:ENDPROC
1730 PRINTTAB(BXX,BYX);CHR
$233
1740 PROCcheck_bomb
1750 ENDPROC
1760 DEFPROCbomb_down
1770 PRINTTAB(BXX,BYX);" "
:BYX=BYX+1:IF BYX)28 THEN B
OMBX=FALSE:ENDPROC
1780 PRINTTAB(BXX,BYX);CHR
$232
1790 PROCcheck_bomb
1800 ENDPROC
1810 DEFPROCbomb_left
1820 PRINTTAB(BXX,BYX);" "
:BXX=BXX-1:IF BXX<0 THEN BO
MBX=FALSE:ENDPROC
1830 PRINTTAB(BXX,BYX);CHR
$233
1840 PROCcheck_bomb
1850 ENDPROC
1860 DEFPROCcheck_bomb
1870 FORIX=1 TO NOX
1880 IF BXX=AXX(IX) AND BY
X=AYX(IX) AND AFX(IX)=FALSE
THEN PROCexplode
1890 NEXT
1900 ENDPROC
1910 DEFPROCexplode
1920 PRINTTAB(BXX,BYX);CHR
$234:BOMBX=FALSE
1930 SOUND1,2,200,5
1940 SCX=SCX+(TYPX+10):AFX
(IX)=TRUE
1950 COMX=TRUE:FORIX=1 TO
NOX:IF AFX(IX)=FALSE THEN C
OMX=FALSE
1960 NEXT
1970 COLOUR131:COLOUR2:PRI
NTTAB(6,30);SCX;COLOUR128:P
RINTTAB(BXX,BYX);" "
1980 ENDPROC
1990 DEFPROCmove_alien
2000 IF AFX(AMX)=TRUE THEN
ENDPROC
2010 PRINTTAB(AXX(AMX),AYX
(AMX));" ";
2020 PROChorizontal
2030 IF FLX=TRUE OR TYPX=3
OR TYPX=4 THEN PROCvertica
l
2040 COLOUR1:PRINTTAB(AXX(
AMX),AYX(AMX));CHR$(227+TYP
X);
2050 IF BOMBX=FALSE THEN 2
070
2060 IF AXX(AMX)=BXX AND A
YX(AMX)=BYX THEN PROCxplode
:ENDPROC
2070 PROCcheck
2080 ENDPROC
2090 DEFPROChorizontal
2100 IF XX=AXX(AMX) THEN F
LX=TRUE:ENDPROC ELSE FLX=FA
LSE
2110 IF XX)AXX(AMX) THEN J
X=1 ELSE JX=-1
2120 AXX(AMX)=AXX(AMX)+JX
2130 ENDPROC
2140 DEFPROCvertical
2150 IF YX=AYX(AMX) THEN F
LX=TRUE:ENDPROC ELSE FLX=FA
LSE
2160 IF YX)AYX(AMX) THEN J
X=1 ELSE JX=-1
2170 AYX(AMX)=AYX(AMX)+JX
2180 ENDPROC
2190 DEFPROCxplode
2200 COLOUR2
2210 PRINTTAB(BXX,BYX);CHR
$234:BOMBX=FALSE
2220 SOUND1,2,200,5
2230 SCX=SCX+(TYPX+10):AFX
(AMX)=TRUE
2240 COMX=TRUE:FORIX=1 TO
NOX:IF AFX(IX)=FALSE THEN C
OMX=FALSE
2250 NEXT
2260 COLOUR131:COLOUR2:PRI
NTTAB(6,30);SCX;:COLOUR128:
PRINTTAB(BXX,BYX);" "
2270 ENDPROC
2280 DEFPROCcomplete
2290 IF LEVX<20 THEN LEVX=
LEVX+1
2300 LX=LX+1
2310 CLS
2320 AMX=0:COMX=FALSE:DEAD
X=FALSE:GAMEOVERX=FALSE:BOM
BX=FALSE
2330 ENDPROC
2340 DEFPROCdead
2350 SOUND0,-15,5,20
2360 COLOUR2:PRINTTAB(XX,Y
X);CHR$224:VDU19,2,15,0,0,0
:TIME=0:REPEATUNTIL TIME>10
0
2370 PRINTTAB(XX,YX);" ";V
DU19,2,3,0,0,0
2380 CLS
2390 LVX=LVX-1:IF LVX=0 TH
EN GAMEOVERX=TRUE
2400 AMX=0:COMX=FALSE:DEAD
X=FALSE:BOMBX=FALSE
2410 ENDPROC
2420 DEFPROCin_top_five
2430 *FX21,0
2440 IF SCX<=HIX(5) THEN E
NDPROC
2450 VDU19,0,4,0,0,0
2460 PROCcentral("CONGRATUL
ATIONS!",5)
2470 PROCcentral("You are
in the top five",8)
2480 PROCcentral("Please e
nter your name",11)
2490 A$=INKEY$(0):IF ASC(A
$)=-1 THEN 2490 ELSE IF A$=
CHR$13 THEN 2560
2500 IF A$=CHR$127 THEN NA
ME$=LEFT$(NAME$,LEN(NAME$)-
1):GOTO2530
2510 NAME$=NAME$+A$
2520 IF LEN(NAME$))15 THEN
 NAME$=LEFT$(NAME$,LEN(NAME
$)-1):SOUND1,-15,50,5
2530 ?&D3=0:PRINTTAB(0,15)
;STRING$(39," ");
2540 ?&D3=255:PROCcentral(
NAME$,15)
2550 GOTO 2490
2560 FAX=FALSE
2570 FORIX=5 TO 1 STEP -1
2580 IF FAX=TRUE THEN 2600
2590 HIX(IX+1)=HIX(IX):HI$
(IX+1)=HI$(IX):IF SCX<=HIX(
IX-1) THEN HIX(IX)=SCX:HI$(
IX)=NAME$:FAX=TRUE
2600 NEXT:IF FAX=FALSE THE
N HIX(1)=SCX:HI$(1)=NAME$
2610 CLS
2620 ENDPROC
2630 DEFPROCmeteor
2640 MYX=YX:MXX=8
2650 FORIX=1 TO 9
2660 PRINTTAB(MXX,MYX);" "
:MXX=MXX+1:PRINTTAB(MXX,MYX
);CHR$235
2670 SOUND1,-15,RND(100)+1
43,1
2680 IF MXX=XX AND MYX=YX
THEN DEADX=TRUE:ENDPROC
2690 PRINTTAB(MXX,MYX);" "
:MXX=MXX+1:PRINTTAB(MXX,MYX
);CHR$235
2700 IF MXX=XX AND MYX=YX
THEN DEADX=TRUE:ENDPROC
2710 PROCmove_you
2720 NEXT
2730 PRINTTAB(MXX,MYX);" "
2740 ENDPROC
2750 ON ERROR OFF:MODE6
2760 IF ERR=17 THEN END
2770 REPORT:PRINT" at line
";ERL
2780 END
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

MicroLink
in association with
TELECOM GOLD

No. 9 May 1986

NEWSLETTER

Now it's e-mail with flowers

NOW MicroLink subscribers can say it with flowers at whatever hour of the day or night the mood strikes them, and their floral gift will be delivered anywhere in the British Isles.

MicroLink has joined forces with the world famous flower delivery service Interflora to create FloraLink, which for the first time ever enables people to send flowers and plants by way of their computer.

FloraLink will have 24-hours-a-day open access and deliveries by Interflora's 2,700 members throughout the UK and Eire can usually be made any day other than Sunday.

Orders sent to FloraLink before noon on a working day can be processed and delivered the same day.

The selection includes freshly cut flowers, bouquets, wreaths and sprays and potted plants – all manner of sizes and specially shaped arrangements to suit the customer's pocket.

FloraLink will carry a price list to give subscribers an idea of just what is available, and payment for the flowers will be by credit card.

Eventually it is hoped to expand FloraLink to cover all Interflora's 44,000 members in more than 130 countries.

Hold that train...

THE train now standing at Platform 4 can be caught courtesy of MicroLink, making subscribers rail journeys simple to organise from home or office.

If they hold a Visa, Access, American Express or Travel Key credit card they can book British Rail tickets, seat and sleeper reservations using MicroLink's new telebooking service.

Seats can be reserved at an extra cost of £1 – or £2 on Pullman services – and the charge for sleeper accommodation is £15 a berth.

MicroLink even helps subscribers choose their trains by carrying constantly updated British Rail timetables, together with fares between London and 20 major cities throughout England, Scotland and Wales.

14 countries already – and still growing!

THE MicroLink family is getting bigger and bigger. Electronic mail users in Eire and New Zealand can now be reached directly through MicroLink.

Subscribers can communicate with them just as easily as they can with other users in the UK.

All that's needed is the system code number – like MicroLink's 72 – of the person in Eire or New Zealand to be put in front of their ID number.

Fourteen countries are now part of the international electronic mail network – Australia, Canada, Denmark, Eire, Germany, Hong Kong, Israel, Korea, the Netherlands, New Zealand, Puerto Rico, Singapore, UK and USA. And a number of others are about to join.

Here's YOUR chance to join MicroLink

All you need to use MicroLink is a computer, modem, appropriate communications software and a telephone. Fill in this coupon below for details on how to join:

Please send me an application form to join MicroLink.

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.....

.....

POST TO: MicroLink, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

High speed from Wick

CAITHNESS Glass, the company that made the Mastermind presentation bowl and many other famous engraved glass trophies, is using MicroLink for a pilot project which may eventually lead to a network linking it with its UK sales reps, agents and shops.

Famous all over the world for its collectors' paperweights and glass-and-silver jewellery, the firm has a greater need than most for reliable, high speed communications.

Situated in Wick, just about as far north as you can get in mainland Scotland, the company has factories in Perth and Oban, its sales office in Stoke-on-Trent, and reps, agents and retail outlets all over the UK.

"Considering the shortcomings of the postal system it would be ideal for everyone to have their own mailbox on a closed MicroLink network to facilitate ordering, financial accounting and stock control", said accounts and systems manager Homer Lindsay.

"It might even be possible to open up a section for micro owners among the 11,000 people around the world who are registered collectors of our paperweights so they can go on-line for the latest news about our products".

Part 2

OSWORD

JOHN WOOLLARD explains how to go about making Osword calls from machine code programs and introduces beginners to assembly language

WE'RE going to take a look this month at how Osword calls are made from machine code programs. If you're not into assembly language now's your chance to begin.

I promise to keep the programs simple and easy to follow and they'll all have the same format.

When writing machine code programs the first step is to choose where you're going to put it in the memory of the computer.

The Electron is very nice to Basic programmers because it protects their programs – it doesn't allow them to be overwritten by the actions of the computer, unless you deliberately start poking about the memory.

The same is not true for machine code programs – we have to find a safe place.

One way is to reserve a block of memory with a DIM instruction like:

```
DIM program% &30
```

This tells Basic to reserve &30 bytes of RAM somewhere in the memory and set the variable *program%* to point to the first location of the block. All of the programs will use this technique to allocate space.

Program I illustrates the use of an Osword call with A=10.

It finds the dot matrix structure or pattern of a displayable character. That is, it finds the eight numbers that would follow VDU 23,x, when defining character x.

Let's consider the Osword call. When it's made the A register contains the number of the call. The X and Y registers point to the location where data is to be passed to or received from the routine invoked.

In this case we're going to need an area or block of memory nine bytes long – one for the Ascii code of the character and eight for its pattern bytes.

We call that area the parameter block and we can choose where it's placed. One common area is zero page from &70 to &8F, these locations aren't used by Basic.

Another area is &900, a miscellaneous buffer area used for various things but often free.

I've used a different technique in Program I. The length of the machine code is about 16 bytes. So a block of memory is dimensioned at least 9 bytes larger.

Now the end of the block can be used as the parameter block for the Osword call. To do that I've placed a label, *block%*, after the final RTS instruction at line 120. It's set to the value of the start of the parameter block when the code is assembled.

The first thing that Program I does is to wait for a key to be pressed by calling OSRDCH at &FFE0. It is equivalent to the Basic instruction GET. The Ascii value of the key pressed is placed in the accumulator (A register).

Line 70 transfers that value from the accumulator to *block%*, the start of the parameter block. Lines 80 and 90 load the X and Y registers with the low and high bytes respectively of *block%*.

This is what is known as pointing to the block with X and Y. The value 10 is placed in the accumulator before the Osword call is made in line 110.

The RTS instruction of line 120 directs control back to the place from where the original call to our machine code program was made, in this case line 160.

The Basic section of the program from lines 180 to 240 analyses the contents of the parameter block by peeking into the locations in turn and displaying the results graphically as well as numerically.

Figure I shows the contents of the parameter block both before and after the Osword call assuming the letter A is pressed.

Now let's turn to Program II, which illustrates how sounds can be made in machine code. It contains

→

```
 10 REM PROGRAM I
 20 DIM program% &30
 30 FOR opt%=0 TO 2 STEP
2
 40 P% = program%
 50 [OPT opt%
 60 JSR &FFE0
 70 STA block%
 80 LDX# block% MOD256
 90 LDY# block% DIV256
100 LDA# 10
110 JSR &FFF1
120 RTS
130 .block%
140 ]
150 NEXT
160 CALL program%
170 REM  analysis of para
meter block
180 FOR k% = 1 TO 8
190 chr% = k%?block%
200 FOR k2%=7 TO 0 STEP-1
210 IF chr% AND 2^k2% THE
N VDU35 ELSE VDU32
220 NEXT
230 PRINT " "chr%
240 NEXT
250 END
```

Program I

Address	Before	After	
XY	65	65	Ascii "A"
XY+1	0	60	Top row
XY+2	0	102	Second row
XY+3	0	102	Third row
XY+4	0	126	Fourth row
XY+5	0	102	Fifth row
XY+6	0	102	Sixth row
XY+7	0	102	Seventh row
XY+8	0	0	Eighth row of matrix

Figure I: Osword 10 parameter block

```
 10 REM PROGRAM II
 20 DIM program% &40
 30 FOR opt%=0 TO 2 STEP
2
 40 P% = program%
 50 [OPT opt%
 60 LDA #97:JSR playnote%
 70 LDA #185:JSR playnote
%
 80 LDA #89:JSR playnote%
 90 LDA #41:JSR playnote%
100 LDA #69:JSR playnote%
110 LDA #69:JSR playnote%
120 RTS
130 .playnote%
140 STA block%+4
150 LDA# 7
160 LDX# block% MOD 256
170 LDY# block% DIV 256
180 JSR &FFF1
190 RTS
200 .block%
210 EQUW 1
220 EQUW -15
230 EQUW 0
240 EQUW 10
250 ]
260 NEXT
270 CALL program%
280 END
```

Program II

From Page 45

three main structures.

The central part of the program is a subroutine that plays a note, called appropriately *playnote%*.

Before that is a list of the notes to be played with calls to the *playnote%* routine.

The final part is the parameter block for the Osword call. This contains the four parameters that a sound command requires, the channel, amplitude or envelope, pitch and duration.

Whenever this program is called it plays the six notes in turn. Their values are in lines 60 to 110. The RTS of line 120 returns control to where the call was originally made, in this case line 270.

The *playnote%* subroutine from line 130 to 190 uses an Osword call with A=7. As in the previous program, the parameter block is indicated by the label *block%* but in this case the parameter block has been filled with data beforehand.

Figure II shows the structure of the parameter block and the data that is necessary for the sound:

```
SOUND 1,-15,100,100
```

Osword with A=7 requires an 8 byte parameter block.
XY=Points to start of parameter block.

Address	Instruction	Bytes stored
XY	EQUW 1	&00
XY+1		&00
XY+2	EQUW -15	&F1
XY+3		&FF
XY+4	EQUW 100	&64
XY+5		&00
XY+6	EQUW 100	&64
XY+7		&00

Figure II: Parameter block for SOUND 1,-15,100,100

to be played. That's placed in the locations from *block%* by the lines 210 to 240 using the EQUW statement. EQUW stores a two byte number in the memory.

For some unknown reason, although the parameters for the sound command could be stored in single bytes since they're all less than or equal to 255, Osword 7 requires them to be stored in two bytes.

The notes played will all be on sound channel 1, with volume −15 and length 10.

```
  10 REM PROGRAM III
  20 DIM program% &40
  30 FOR opt%=0 TO 2 STEP
2
  40 P% = program%
  50 [OPT opt%
  60 LDA# 0
  70 STA &70
  80 .newnote%
  90 LDX &70
 100 LDA notes% , X
 110 CMP# 255 : BEQ rts%
 120 JSR playnote%
 130 INC &70
 140 JMP newnote%
 150 .rts% RTS
 160 .playnote%
 170 STA block% + 4
 180 LDA# 7
 190 LDX# block% MOD 256
 200 LDY# block% DIV 256
 210 JSR &FFF1
 220 RTS
 230 .block%
 240 EQUW 1
 250 EQUW -15
 260 EQUW 0
 270 EQUW 10
 280 .notes%
 290 EQUB 97
 300 EQUB 105
 310 EQUB 89
 320 EQUB 41
 330 EQUB 69
 340 EQUB 69
 350 EQUB 255
 360 ]
 370 NEXT
 380 CALL program%
 390 END
```

Program III

```
  10 REM PROGRAM IV
  20 DIM program% &FF
  30 FOR opt%=0 TO 2 STEP
2
  40 P% = program%
  50 [OPT opt%
  60 LDX# envelope1% MOD 2
56
  70 LDY# envelope1% DIV 2
56
  80 LDA# 8
  90 JSR &FFF1
 100 LDX# envelope2% MOD 2
56
 110 LDY# envelope2% DIV 2
56
 120 LDA# 8
 130 JSR &FFF1
 140 LDX# envelope3% MOD 2
56
 150 LDY# envelope3% DIV 2
56
 160 LDA# 8
 170 JSR &FFF1
 180 LDX# envelope4% MOD 2
56
 190 LDY# envelope4% DIV 2
56
 200 LDA# 8
 210 JSR &FFF1
 220 RTS
 230 .envelope1%
 240 EQUB 1
 250 EQUB 8
 260 EQUB 256-8
 270 EQUB 8
 280 EQUB 1
 290 EQUB 1
 300 EQUB 1
 310 EQUB 0
 320 EQUB 0
 330 EQUB 0
 340 EQUB 0
 350 EQUB 0
 360 EQUB 0
 370 EQUB 0
 380 .envelope2%
 390 EQUB 2
 400 EQUB 1
 410 EQUB 1
 420 EQUB 256-2
 430 EQUB 1
 440 EQUB 7
 450 EQUB 5
 460 EQUB 12
 470 EQUB 0
 480 EQUB 0
 490 EQUB 0
 500 EQUB 0
 510 EQUB 0
 520 EQUB 0
 530 .envelope3%
 540 EQUB 3
 550 EQUB 1
 560 EQUB 6
 570 EQUB 6
 580 EQUB 6
 590 EQUB 2
 600 EQUB 2
 610 EQUB 1
 620 EQUB 126
 630 EQUB 0
 640 EQUB 0
 650 EQUB 256-126
 660 EQUB 126
 670 EQUB 126
 680 .envelope4%
 690 EQUB4
 700 EQUB 1
 710 EQUB 4
 720 EQUB 256-4
 730 EQUB 4
 740 EQUB 10
 750 EQUB 20
 760 EQUB 10
 770 EQUB 126
 780 EQUB 0
 790 EQUB 0
 800 EQUB 256-126
 810 EQUB 126
 820 EQUB 126
 830 ]
 840 NEXT
 850 CALL program%
 860 SOUND 1, -15, 200, 10
 870 inkey% = INKEY(100)
 880 SOUND 1, 1, 200, 10
 890 inkey% = INKEY(100)
 900 SOUND 1, 2, 200, 10
 910 inkey% = INKEY(100)
 920 SOUND 1, 3, 200, 10
 930 inkey% = INKEY(100)
 940 SOUND 1, 4, 200, 10
 950 END
```

Program IV

Line 140 of the playnote routine stores the note value passed in the accumulator in location *block%+4*, that is, it is placed in the frequency location.

Program III is a re-write of Program II showing how a block of data can be used instead of many lines of programming.

In Program II each note played had to have a separate call to the playnote routine. If we wanted to play 200 notes it would have meant typing 200 lines of programming of the form:

```
LDA #1:JSR playnote%
```

Lines 290 to 340 of Program III contain the same notes as Program II, followed by a note value of 255 to indicate the end of the tune

Lines 60 and 70 set a counter stored in &70 to zero. This is incremented each time a note is played. It is loaded into the X register and used as an offset into the table of note values.

Now we've mastered how to produce sounds from machine code we will have a go at defining envelopes using Osword with A=8.

Osword with A=8 requires a 14 byte parameter block.
XY=Points to start of parameter block.

Address	Instruction	Byte stored
XY	EQUB 1	&01
XY+1	EQUB 2	&02
XY+2	EQUB 5	&05
XY+3	EQUB -10	&F6
XY+4	EQUB 5	&05
XY+5	EQUB 10	&0A
XY+6	EQUB 20	&14
XY+7	EQUB 30	&1E
XY+8	EQUB 0	&00
XY+9	EQUB 0	&00
XY+10	EQUB 0	&00
XY+11	EQUB 0	&00
XY+12	EQUB 0	&00
XY+13	EQUB 0	&00

Figure III: Parameter block for ENVELOPE 1,2,5,-10,5,10,20,30, 0,0,0,0,0,0

This requires a 14 byte parameter block, one for each of the 14 envelope parameters you would normally use in Basic. Figure III shows the structure of the parameter block.

Although Program IV may look long and complex its structure is remarkably simple. The data for the four envelopes is placed in lines 230 to 820. The first section from lines 60 to 220 simply loads X and Y with the address of the parameter block for each envelope, loads the ,value 8 into the accumulator then calls Osword.

The final section in Basic demonstrates each of the envelopes in turn with a one second gap between each sound. I've used 14 EQUB commands in lines 230 to 370 for envelope 1. By simply changing the values placed in lines 230 to 820 the nature of the envelopes can be altered.

● *Next time we'll be looking at the Osword calls concerned with graphics. We'll see how they can be used in machine code programs and how they can increase our programming powers in Basic.*

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Make no mistake add more Basic

ROBIN NIXON demonstrates how to introduce new keywords to the Electron's BBC Basic

BBC Basic is probably the best Basic around. But good as it is, do you ever find there are certain commands on other micros, not available on the Electron or BBC Micro, that you would like to use – such as WHILE . . . WEND?

Or do you ever wish you could add your own commands to BBC Basic – such as a facility to swap the contents of two variables?

Well, over the next few months I'll show you how to do just that. Don't worry if you're not too sure about machine code. The example programs given are complete and require no knowledge of assembler to use them. But I hope these articles will give a clearer idea of machine code to those of you interested in learning it.

This month we'll kick off with finding out how to add the simple one character command B, for BEEP.

Type in and run this program.

```
10 REM Example
20 PRINT "HELLO"
30 B
```

What happens is that the computer expects a Basic keyword at the start of line 30. It doesn't recognise the B and consequently reports:

Mistake at line 30

To create this error message the interpreter sends an error number along with a corresponding error message to the error handler. The location of the error handler is stored in addresses &202 and &203, which together are known as the Break (BRK) vector.

So here's our first clue as to how we can approach adding our own keywords. What we must do is redirect the Break vector to point to our own routine which will trap any errors that occur. If an error is not "Mistake" we return control back to Basic's error handler, and if it is we can go on and do some further checking.

This is how we do it. Take a look at lines 340 to 480 of Program I. Lines 340 and 350 load the contents of the Break vector – which is stored at &202 and &203 – into the A and X registers of the 6502.

Lines 360 to 390 check whether the vector has already been changed, and if so jump to *alreadychanged* which, being an RTS, returns straight back to Basic.

However if the vector hasn't already been changed, lines 430 and 440 store its contents in &70 and &71, and lines 450 to 480 reset the vector to point to *main* where we can then check whether or not the error was "Mistake".

As we are interrupting the Basic interpreter's execution, lines 560 to 600 save the contents of registers A, X and Y by pushing them on to the

Start of a new series

–you can commands

6502 stack.

Now we are ready to test for "Mistake". If you look in the manual you will see that this is error number 4. When the Basic interpreter generates an error it leaves locations &FD and &FE pointing to a byte containing the error number.

Lines 610 to 640 check this byte to see if it is 4, and if it is the error must be "Mistake" so a branch is made to *beep*.

Otherwise, lines 680 to 720 pull the stored contents of A, X and Y back off the stack and line 730 forces execution to jump to the location pointed at by &70 and &71. You will remember that this is the actual location of the normal error handling routine we copied earlier from &202 and &203.

So far, so good. We have established that the error was error number 4 – "Mistake" – and now we need to discover whether the error was generated by our new keyword, B.

The Basic interpreter uses a pointer in zero page to tell where it is in a program. This is called Pointer A or PTRA for short. This pointer is located at &A, &B and &C.

Why three bytes? Well, &B and &C point to the start of the current Basic statement being executed and &A acts as an offset to the exact position within that statement.

When an error is encountered PTRA points to one character after the start of the error in the program. So lines 770 to 830 take the contents of PTRA and place it in locations &80 and &81. In this case we are only using two bytes by adding the offset at &A to &B and &C, and storing the result in locations &80 and &81. Then lines 840 to 900 subtract 1 from &80 and &81, and lines 910 to 930 test to see if the character pointed to is a B.

If not, line 940 jumps to *notbeep* which exits to Basic's error handling routine.

At last, at line 950 we have found the new keyword B, so lines 950 and 960 do the equivalent of:

```
PRINT CHR$(7)
```

Which is, of course, a beep!

All that's left for us to do now is to return execution to the Basic interpreter. This is done by lines 1000 to 1060.

Line 1000 calls a routine in the Basic ROM which moves PTRA on to the next statement in the same line – if there is one. Otherwise PTRA moves to the start of the next program line.

The three PLAs in lines 1010 to 1030 pull the contents of the A, X and Y registers off the stack because, as we are not going to the error handling routine, they are not needed any longer.

The five PLAs in lines 1040 to 1080 pull off unwanted error handling information that would have been passed to the error handler. And, finally, line 1090 jumps to a routine in the Basic ROM which continues program execution from where it left off.

So, with a bit of jiggery pokery, we have managed to intercept the Break vector and cancel its action if the error was caused by the new command B.

● *Next time we'll have a look at how to add more than one extra command and also how to make these commands as long as we want rather than just single characters.*

```
100 REM ******************
110 REM *                *
120 REM *     BEEP       *
130 REM *                *
140 REM *  By  R.Nixon   *
150 REM *                *
160 REM * (c)  Electron  *
170 REM *       User     *
180 REM *                *
190 REM ******************
200 REM
210 MODE6
220 oswrch=&FFEE
230 osword=&FFF1
240 osbyte=&FFF4
250 checkend=&9857
260 continue=&8B9B
270 FOR PASS=0 TO 3 STEP3
280 P%=&C00
290 [
300 OPT PASS
310 \
320 .start
330 \
340 LDA &202
350 LDX &203
360 CMP #main MOD &100
370 BNE changebrkvector
380 CPX #main DIV &100
390 BEQ alreadychanged
400 \
410 .changebrkvector
420 \
430 STA &70
440 STX &71
450 LDA #main MOD &100
460 STA &202
470 LDA #main DIV &100
480 STA &203
490 \
500 .alreadychanged
510 \
520 RTS
530 \
540 .main
550 \
560 PHA
570 TYA
580 PHA
590 TXA
600 PHA
610 LDY #0
620 LDA (&FD),Y
630 CMP #4
640 BEQ beep
650 \
660 .notbeep
670 \
680 PLA
690 TAX
700 PLA
710 TAY
720 PLA
730 JMP (&70)
740 \
750 .beep
760 \
770 LDA &A
780 CLC
790 ADC &B
800 STA &80
810 LDA &C
820 ADC #0
830 STA &81
840 SEC
850 LDA &80
860 SBC #1
870 STA &80
880 LDA &81
890 SBC #0
900 STA &81
910 LDY #0
920 LDA (&80),Y
930 CMP #ASC"B"
940 BNE notbeep
950 LDA #7
960 JSR &FFEE
970 \
980 .cont
990 \
1000 JSR checkend
1010 PLA
1020 PLA
1030 PLA
1040 PLA
1050 PLA
1060 PLA
1070 PLA
1080 PLA
1090 JMP continue
1100 ]
1110 NEXT
1120 CALL &C00
```

This listing is included in this month's cassette tape offer. See order form on Page 61.

Program I

DIP YOUR BRUSH AND LET'S GET PAINTING

Part Three of the Electron graphic series by TREVOR ROBERTS

IN the past two articles a lot of ground has been covered. We've learnt about the COLOUR and VDU 19 commands and seen how to make our text more colourful.

We've talked of logical and actual colours and seen how they can be compared to pots and paint or pens and ink.

Finally we've made a minor exploration of the Electron's seven modes. Figure I shows some of their differing characteristics.

However we've got all this knowledge but so far never used it in a program. Well it's third time lucky, as we'll be looking at five programs using the commands we've learnt.

First let's have a brief look at PRINT. This is almost certainly the first Basic command you came across and should be fairly familiar.

If not, refresh your memory by seeing the effects of the following:

```
PRINT "a string"
PRINT 23
PRINT "a string","another
string"
PRINT  "a string";"another
string"
PRINT 23,45;67
PRINT 23,"a string"
```

You can do a lot with simple PRINT statements but it can be difficult to get characters exactly where you want.

Suppose, for reasons best known to yourself, you wanted to put an asterisk 10 character spaces in from the left of the screen. You could do it with:

```
PRINT '          *"
```

but it's rather nasty and open to confusion. Better is to use the TAB command. This follows the PRINT command and tells the Electron exactly where to place what follows. To get our asterisk into the tenth character space we use:

```
PRINT TAB(9)"*"
```

That 9 may be a bit confusing, after all we want the asterisk in the tenth character space. It's all down to the fact that computers start counting at 0, not 1.

TAB measures from the left of the screen, so the first character space is numbered 0, the second 1, and so on the tenth character, numbered 9.

Explore the uses of TAB with:

```
PRINT TAB(0) "*", TAB(8)"*"
PRINT TAB(50) "*"
PRINT TAB(15) "*" TAB(18)
"*"
```

and remembering that different modes have different numbers of characters to a line, don't just stick to Mode 6.

Useful as it is, this simple TAB is still, in practice, stuck to one line, although now we can put our characters exactly where we want.

However it's obviously better to have the ability to put our character anywhere on the screen. This is made possible by adding another parameter inside the brackets following the TAB. Try:

```
PRINT TAB(9,4)"*"
```

and you'll see an asterisk appear on the fifth line down from the top in the tenth character space in from the left.

From this you'll gather that this use of the TAB command takes the form:

```
TAB(across, down)
```

As before, *across* is the number of character spaces in from the left, measurement starting at 0 and *down* is the number of lines down from the top of the screen, the top line being numbered 0.

Program I uses TAB to place an asterisk anywhere you want on the screen.

Line 20 of the program puts the Electron into Mode 5. This is a four colour mode having 32 lines each consisting of 20 characters. Line 30 switches off the flashing cursor. Leave it out and see what happens.

The variables *across* and *down* are to be used to store the positions of the asterisk. Lines 50 to 70 get the value of *across*, suitably mugtrapped to make sure that only sensible values are allowed. Lines 80 to 100 do the same thing for *down*.

Once this information is gained the screen is cleared and the asterisk placed in the required position.

The last line is just an endless loop, there to stop the prompt > appearing.

Play around with the program and try altering it for other modes until you get the feel of the relationship between the screen and TAB command.

And notice one thing. When you try to put an asterisk on the bottom line (31), it actually appears on the line above.

What's gone wrong? Well, nothing really, it's just that when the last line is used the Electron makes room for more text by scrolling the screen up one line.

This is what happens to our unfortunate asterisk. It gets printed but is immediately scrolled up one line. This can often lop off the top of a beautiful graphics display. Usually it makes life easier if you don't try to PRINT on the bottom line.

This scrolling isn't always a

Mode	Number of colours	Text		Memory used
		lines	char	
0	2	32	80	20k
1	4	32	40	20k
2	16	32	20	20k
3	2	25	80	16k
4	2	32	40	10k
5	4	32	20	10k
6	2	25	40	8k

Figure I: Electron modes

```
  10 REM Program I
  20 MODE 5
  30 VDU 23,1,0;0;0;0;
  40 across=0:down=0
  50 REPEAT
  60 INPUT "How far across
",across
  70 UNTIL across)-1 AND a
cross<20
  80 REPEAT
  90 INPUT "How far down",
down
 100 UNTIL down)-1 AND dow
n<32
 110 CLS
 120 PRINT TAB(across,down
) "*"
 130 REPEAT UNTIL FALSE
```

Program I

bad thing. It can be quite useful. Take a look at Program II.

```
10 REM Program II
20 MODE 2
30 VDU 23,1,0;0;0;0;
40 FOR loop=1 TO 100
50 COLOUR RND(7)
60 PRINT TAB(RND(20))"*"
70 NEXT loop
80 COLOUR 7
```

Program II

This takes advantage of the seven non-flashing colours in Mode 2 to fill the screen with stars (well, asterisks).

The FOR . . . NEXT loop formed by lines 40 to 70 cycles 100 times.

Each time round the loop line 50 uses the RND command to pick a number between 1 and 7, giving in effect, a random foreground colour.

The next line also uses RND, this time inside a TAB command. The result is that a randomly coloured asterisk is placed at a random spot on a line, one to a line.

For the first 31 cycles of the loop the Electron can handle it and the screen fills up. However as the last line is filled and the program carries on printing the Electron has to scroll the screen, moving everything up one line.

As the program proceeds this happens over and over. Hence the screen full of moving stars. Can you alter the program so that it also uses the flashing colours ("twinkle, twinkle little asterisk")?

Also see if you can get more than one asterisk on the line.

More practically, Program III shows how to use different background colours to brighten up and emphasis text displays. It uses the fact that when the Electron prints a space it prints it in the background colour. Change this to a different logical colour and you get a coloured block on the screen.

Tha first lines of the program put the Electron into Mode 1, putting the user's name in *name$* and storing its length in the variable *length*. The screen is cleared and then line 60 turns the foreground colour to black.

Since this won't show up against a black background we now have to do something about changing the background colour. Line 70 turns the background colour to red and the next line puts a red block on the screen.

Line 90 puts a string into the block. As a result of the previous two COLOUR commands this is black letters on a red background and it merges into the block's red background.

Now line 130 sets the background colour to yellow and PRINTs a yellow block, two spaces longer than *name$* which is itself then put into place.

The last two lines set the background and foreground colours back to normal. These techniques can be used to add to the effectiveness of program displays.

Program IV uses the principle of coloured spaces to make a colourful block on a Mode 2 screen. This is done in lines 20 to 100, using nested FOR . . . NEXT loops to print lots of differently coloured spaces.

Now the program waits for a key to be pressed before going on to the FOR . . . NEXT loop of lines 120 to 140.

This cycles seven times and each time the VDU 19 sets the logical colour numbered *loop* to actual colour 0, black.

```
 10 MODE 1
 20 INPUT "WHAT IS YOUR NAME? "name$
 30 CLS
 40 length=LEN(name$)
 50 COLOUR 0
 60 COLOUR 129
 70 PRINT TAB(9,10) STRING$(14," ")
 80 PRINT TAB(10,10) "Your name is"
 90 COLOUR 130
100 PRINT TAB(23,10) STRING$(length+2," ")
110 PRINT TAB(24,10) name$
120 COLOUR 128
130 COLOUR 3
```

Program III

```
 10 REM Program IV
 20 MODE 2
 30 VDU 23,1,0;0;0;0;
 40 FOR outer=1 TO 10
 50 FOR inner=1 TO 10
 60 COLOUR 128 + RND(7)
 70 PRINT " ";
 80 NEXT inner
 90 PRINT
100 NEXT outer
110 wait$=GET$
120 FOR loop=1 TO 7
130 VDU 19,loop,0,0,0,0
140 NEXT loop
150 wait$=GET$
160 FOR loop=1 TO 7
170 VDU 19,loop,loop,0,0,0
180 FOR delay=1 TO 500:NEXT delay
190 NEXT loop
200 COLOUR 128
```

Program IV

So the pretty pattern disappears as each of the seven logical colours it is made up of is set to black and so merges into the rest of the screen's background.

It's the equivalent of all the pots being filled with black paint or the pens being filled with black ink. There are still seven colours on the screen only they're all black!

Again the program waits for a key to be pressed when the program goes onto the FOR . . . NEXT loop formed by lines 160 to 190.

Here line 170's VDU 19 switches the colours back to what they were. As *loop* varies so logical colour 1 is filled with actual colour 1, logical 2 with actual 2 and so on.

The delay loop of line 180 just slows things down so that the reappearance of the colours is shown in separate stages. Once the program drops out of the loop the background colour is set back to black.

This trick of changing the actual colours in the logical colours to blend into the background and then making them reappear can produce some interesting effects.

Program V shows this palatte – switching technique, as it is known, giving a simple form of animation.

```
 10 REM Program V
 20 MODE 5
 25 VDU 23,1,0;0;0;0;
 30 COLOUR 129
 40 PRINT TAB(9,15) CHR$(32);
 50 COLOUR 130
 60 PRINT CHR$(32);
 70 COLOUR 131
 80 PRINT CHR$(32)
 90 COLOUR 128
100 VDU 19,1,0,0,0,0
110 VDU 19,2,0,0,0,0
120 VDU 19,3,0,0,0,0
130 REPEAT
140 FOR loop=1 TO 3
150 VDU 19,loop,7,0,0,0
160 FOR delay=1 TO 500:NEXT delay
170 VDU 19,loop,0,0,0,0
180 NEXT loop
190 UNTIL FALSE
```

Program V

The first nine lines result in three blocks next to each other on the screen. Each block is of a different logical colour.

The next three lines, 100-120, set each of the three logical colours to the actual colour 0, black. The blocks disappear.

The program now enters an endless REPEAT . . . UNTIL loop. It's the FOR . . . NEXT loop inside this endless loop that causes the animation effect.

As the loop cycles three times, so each logical colour in turn is filled with white (actual colour 7) and then, after a short delay, switched back to black. The result is that each block briefly appears and then disappears.

The eye sees the successive appearances of the white blocks and interprets it as one white block moving, rather than three being switched on and off in turns. The result is animation.

And that's where we finish for this time. Apart from TAB we haven't learned any new commands but we have seen how to use them in colourful ways.

Try them out in your own programs. And don't worry if you get carried away with it.

● *Next month I'll show you where to draw the line.*

Using random access filing

By ROLAND WADDILOVE

OVER the next two articles we'll be seeing what random access filing is and how to use it. This is something only available with disc filing systems – ADFS, DFS and Cumana.

As you know, when the Electron is switched off it forgets any data or variables that may have been used within a program.

Most of the time this doesn't matter, but suppose we wanted to construct a database containing a list of names and telephone numbers.

After entering all our data we don't want to lose it when we switch off, so we create a special file to store our data.

Program I is a short example showing how 26 numbers can be stored in a file.

```
10 REM PROGRAM I
20 file=OPENOUT "Data"
30 FOR i=1 TO 26
40 BPUT# file,i+64
50 NEXT
60 CLOSE# file
```

Program I

To create an empty file ready for storing data we use OPENOUT. If a file with the same name already exists it will be deleted, so be careful.

Since the Electron can handle several files at once – 10 with the ADFS – each file is given a separate label or channel number so as to avoid confusion. This is stored in *file* in Program I.

Line 40 writes the data to the file using BPUT#. This puts one byte of data in the file, the loop counter plus 64, the Ascii codes for the letters A to Z.

Each time round the loop BPUT# puts the next byte on to disc immediately following the previous one. Finally the file is closed and the data is safe on disc.

Program II reads the data back from the file and prints the corresponding character. You'll see that it prints the alphabet.

```
10 REM PROGRAM II
20 file=OPENIN "Data"
30 REPEAT
40 byte=BGET# file
50 PRINT CHR$(byte);
60 UNTIL EOF# file
70 CLOSE# file
```

Program II

OPENIN opens the file for reading and BGET# reads a byte of data. We know there are 26 bytes of data in the file so we could use a FOR/NEXT loop.

However there's a alternative way. Program II simply reads data until the End OF the file. EOF# will be true and the file is closed.

When a file is opened for reading or writing the pseudo variable PTR# is set to zero. This is a PoinTeR pointing to the position in the file of the next byte to be read or written.

For instance, if PTR# is 0 the first byte in the file will be read or written and PTR# will be incremented to 1.

If PTR# is 5 the sixth byte – counting from zero remember – will be read or written and PTR# will then be incremented to 6.

Program III asks for a number to be entered. It sets PRT# and reads a byte from the file created by Program I and prints the corresponding character.

Enter 5 and see what you get. Byte 0 of the file is 65, byte 1 is 66, byte 2 is 67 and so on. Byte 5 is 70, hence F is printed – CHR$(70).

This is what is known as random access filing. We can move a pointer throughout the

```
10 REM PROGRAM III
20 file=OPENIN "Data"
30 INPUT "Byte ";number
35 PTR# file=number
40 byte=BGET# file
50 PRINT CHR$(byte);
70 CLOSE# file
```

Program III

file at random and access any byte within the file.

Program IV is interesting. It reads the file backwards. See if you can work out what is happening.

```
10 REM PROGRAM IV
20 file=OPENIN "Data"
30 FOR i=25 TO 0 STEP -1
35 PTR# file=i
40 byte=BGET# file
50 PRINT CHR$(byte);
60 NEXT
70 CLOSE# file
```

Program IV

We have seen how single bytes may be written to or read from a file, now we'll look at string and numeric variables.

Program V asks for five strings which are stored one by one in a file. To write a whole string – or any number or variable for that matter – to a file we use PRINT#

```
10 REM PROGRAM V
20 file=OPENOUT "Data"
30 FOR i=1 TO 5
40 INPUT "String ";a$
50 PRINT# file,a$
60 NEXT
70 CLOSE# file
```

Program V

To retrieve the data we use INPUT#. Program VI shows how the strings can be recovered.

```
10 REM PROGRAM VI
20 file=OPENIN "Data"
30 FOR i=1 TO 5
40 INPUT# file,a$
50 PRINT a$
60 NEXT
70 CLOSE# file
```

Program VI

Obviously reading or writing a string or numeric variable to a file involves many bytes. This is handled for us by Basic when we PRINT# or INPUT#.

A point to remember is that we couldn't write a numeric variable to the file and later input a string. That would give us a Type mismatch error.

If you:

```
PRINT# file,a$,x%
```

you would need to:

```
INPUT# file,a$,x%
```

to retrieve the data. Try:

```
INPUT# file,x%,a$
```

and you'll get an error.

● *In the next article we'll use random access filing to write a database in which all the data is stored on disc. This will enable you to handle up to 640k of data, depending on the type of disc system you've got.*

Micro Messages

MAKE THE MOST OF YOUR KAGA

IN Micro Messages last year you said that you use Epson, Brother and Kaga printers.

A couple of weeks ago I bought a Kaga/Taxan KP810 dot matrix printer and it came with a 182 page manual which I read in great detail.

I found the manual hard to understand and could not work out how to use the control codes for setting up the printer, such as Esc "(" for the near letter quality mode.

Please could you help me? – **Z. Adams, Harpenden, Herts.**

● The Kaga printer manual is one of the best around but it still needs a deal of effort to extract the correct commands from the information given.

Firstly, you need to know how to turn on your printer so that everything printed on the screen is echoed to the printer. This is done with the commands:

```
VDU 2
```

Enter this and type some message in and press Return a few times. If your printer doesn't move to a new blank line of paper each time you press Return you should enter the command:

```
*FX6
```

which tells the Electron to produce its own line feed characters to move the paper through the printer.

Once you have got your printer to successfully print messages out you can turn it off with:

```
VDU 3
```

Now you know that VDU 2 and VDU 3 are used to turn the printer on and off you must convert the ESC type commands into instructions your Electron understands.

ESC"(" (to select NLQ) means send the ESC character followed by the (character. These are normally sent as strings of numbers after VDU statements.

The ESC character is the number 27 and the '(' is 40. The numbers correspond to the Ascii codes of the characters. You can find the Ascii code of a character in the following way:

```
PRINT ASC"("
```

where the quotes surround the symbol given in the manuals.

Once the correct numbers have been found you must send them to the printer using VDU:

```
VDU 2,1,27,1,40,3
```

This selects NLQ on the Kaga and turns the printer on and off in the same operation.

Note that all numbers sent to the printer must be preceded by a 1, except the 2 and 3 which turn the printer on and off.

ROM cartridges

DO the Plus 1 and Slogger Rombox take the same ROM cartridges?

I would like to get an ADDCOM which I know works on the Slogger Rombox but I am not sure whether the ADDCOM works on the Plus 1.

I would also like a joystick and buying the Plus 1 would be cheaper than buying a joystick, interface and a Slogger Rombox. – **David Cattrall, Bangor, Gwynedd.**

● Addcom works perfectly on the Electron with Plus 1 and Plus 3. You'll need a blank ROM cartridge (Advanced Computer Products Advanced Rom Adapter) to plug it into the Plus 1.

Speed-up board

PLEASE could you tell me what BBC software would the Andyk Fast Electron Board need to enable the Electron to run, such as Knight Lore, Match Day and so on?

Will they be coming out for the Electron anyway? – **P.D. Billany, Stockport.**

● Any BBC Micro programs which already run on the Electron will run faster with the Andyk board.

However this doesn't mean that programs which didn't work before will magically work once the Andyk speed up board is installed.

Losing the top line

I OWN an Electron Plus 1 and wonder if anyone could tell me how to lower the top line of the programs on the screen, as I seem to miss the first line of some programs.

I have tried typing in:

```
A=POS:B=VPOS-1
VDU31,1,1:PRINTTAB(A,B)
```

which will lower the Electron caption, but as soon as I load a program the text returns to normal. – **A. York, Weeting, Norfolk.**

● The Electron's display can't be altered but the TV picture can. Ask a TV engineer to lower the height of the picture.

Although a simple operation it's one best left to a qualified person, unless you know what you're doing.

Now for the good news

I AM writing to comfort uncertain Electron owners who say that all the big software houses have ignored the Electron's existence.

Imagine were obviously lured by the Electron's potential and popularity.

Their Yie Ar Kung Fu is the latest intercomputer release and is brilliant value for £8.95.

I have already found one "cheat" knocking your opponent out at the same time as he knocks you out. You get 200,000 points for this. – **James Toner, Stourbridge.**

Flickering screen

I GOT my Electron in February 1985, and it was OK but about two months later the screen started flickering making the computer unusable.

I took it back to where I bought it and immediately got a new one.

When I got it home I found that it wouldn't come on, I returned it and got another one. This also didn't come on the screen properly – indeed you could hardly see it.

The next one wouldn't load anything and I was informed that the loading chip had burned out.

They mended it for me, and it was OK for a while, but then the sound went funny.

A few months later the sound returned to normal and my computer worked in every way.

But about three weeks ago it broke down again and as the guarantee had run out, I took it to another place to get mended. They promised to tell me what was wrong with it within a week, but I have not heard from them yet – so I have been without my computer for another three weeks.

I wondered if anyone else has had problems like this? – **Andrew Clark, Hull.**

● The Electron is quite a reliable micro so perhaps you've just been unlucky.

However when computers

→

From Page 53

go wrong pin-pointing the cause of the problem can be very difficult. People with the knowledge to repair micros quickly and efficiently tend to have more lucrative jobs than repairmen.

If you do find one who knows what he's doing treat him like gold, even if you don't pay him in it.

Bugged by big numbers

WHILE programming on my Electron last week, I came across a new bug.

If a program has a first line number of 256 or greater then on Breaking the program and recovering it using OLD, or even on just using OLD without Break, the first line number will be changed by the Electron.

The number allocated by the Electron is the remainder left after subtracting multiples of 256 from the original line number.

I contacted Acorn who did not know of this bug and advised me that my Electron was faulty. However, I found that the same occurs on other Electrons and hence presume that it is a general bug.

Could you verify this and publish the details as I was about to send my Electron off for repair on the basis of Acorn's information? – **John A. Blackwell, Ellon, Aberdeen.**

● There's nothing wrong with your Electron, despite what Acorn said.

The bug is well known and the BBC Micro manual points out that the line number is corrupted if it is greater than 255 when Break is pressed.

The obvious answer is don't start a program with a line number that's too big – start at 10 or 100, rather than 2000.

Installing a ROM

ACCORDING to the main PCB circuit diagram in my Electron service manual IC18 is not fitted.

As the tracks connect with the same data and address buses as IC2 would it be possible to install a ROM, for instance ACP's ADT, in this position? – **T.G. Simonds, RAF Brize Norton, Oxon.**

● It may be possible to insert a ROM socket on the main PCB, but it would be difficult, time consuming and expensive.

We suggest buying a Rombox from Slogger or a ROM adapter from ACP.

You'll find them much more convenient to use than delving into the inside of the Electron every time you want to change ROMs.

Plus 1 games

I GOT the Electron User *special offer Plus 1 interface for Christmas and am experiencing difficulties loading games.*

I have tried disabling the interface by typing in a short program, and although this works for Elite it does not work for many of my other games, such as Confuzion.

With Confuzion, the title page and the two following programs will load, but after the second program it then freezes.

This disables all the keys except Break which when pressed, blanks the screen.

All the games load normally when the interface is taken off, but I don't want to keep doing this in case I cause some damage.

Can you explain why this is happening and suggest ways of overcoming the problem? – **T. Burnitt, Hull, N. Humberside.**

● This is a common problem which we have covered before. Here's the solution again for the benefit of new readers. Enter:

```
*FX163,128,1
?&212=&06
?&213=&F1
?&2AC=0
```

Then chain your program. This code disables the Plus 1 completely preventing memory clash problems with the software.

Missing logo

THE businessman in the centre pages of Electron User *was holding an interface with the Acorn Electron logo on the top left hand corner but when I bought mine it did not have one.*

The following weekend I was in a High Street store and I noticed a Plus 1 with the logo on it and the assistant said all of their stock had it on.

Are the ones with and without stickers new and old models, or is it just a way to identify shop-bought ones from sellers of the same product like yourself? – **P. Dowell, Linthithgow, Scotland.**

● Some Plus 1s have Acorn Electron stickers, some haven't. Apart from that there appears to be no difference between them.

Audible warning

CAN the computer make some type of noise when it displays the words Data, Rewind Tape, because I like to do other things while the game is

Key to the Citadel

HERE are a few tips for Citadel by Superior Software. Crystal One is in the room above the main hall. The second crystal is in the witch's house. To get in, bounce into the room on the trampoline and fall down the chimney.

Before you can collect the crystal you must kill the witch.

To do this get the green skull from the west tower, jump over the cauldron and it will fall in.

Do the same to the pink thing and the grey object from the pyramid, then the witch will die and you can go down and get the second crystal.

The third is in the lab which is down the well. To get it you have to collect the ice crystal from the cellar then go to the east tower where the green key is.

The water will be frozen so you can get the key. Take it to the well wheel and pull the lever.

Then get the cannon ball from the mountains, the powder from the west wing above the arena and go down the well.

Go right at the screen second from the bottom of the well. Walk into the cannon which will knock down the wall and you can get the crystal.

The fourth crystal is in the central tower. First go to the screen next to the tower and throw the switch.

Next go to the top of the east tower and fall off diagonally, get killed by the Monk, again fall diagonally and you will land on the blue wall.

Go left and throw that switch. Now move to the screen left of the central tower and jump on to the platform. When it is at its highest point jump right to land higher on the central tower.

Walk into the C and you will get transported to where the fourth crystal is.

The last crystal is the hardest. Get the heads from the bottom of the well and the prison.

Go into the pyramid and drop the heads – this will stop the mummies chasing you.

Get the chicken from the freezer and cook it in the kitchen. Take it to the temple past the star port, until you come to the ocean where a multicoloured ball stops you.

Collect the statue and take it to the bottom of the pyramid where the last crystal will appear. – **Tim Walter, Monks Park, Bristol.**

● Many thanks Tim. We have had a lot of letters asking for tips and clues for Citadel.

loading.

By the way I have found a way to get higher scores on Beach Head.

When you go to meet the enemy fleet move your cross to the big open gap where a white line stops you going back out again.

When you have defeated the enemy fleet you can go back through the secret passage and fight the enemy fleet again.

I have done this many times and have completed the whole thing as well. This greatly improved my score. – **Tom Poole, Nailsea, Bristol.**

● The Electron can either load a program or make sounds. It is not possible for it to do both at the same time.

This is because the ULA uses the same register for reading data from tape and outputting data for sounds, so it can't read and output simultaneously.

Talking shortly

ON BBC's Saturday Superstore on February 8, I saw a tape called Speech! by Superior Software.

Is it or will it be available for the Electron? – **Simon Clark, Cheltenham.**

● Superior tell us Speech! will not be available on the Electron.

RAM into ROM doesn't go

I RECENTLY got a Plus 1, an Advanced ROM Adapter II from Advanced Memory Systems and Slogger's own Elkman. I have got Elkman plugged into the ROM adapter which is then plugged into the Plus 1.

As I have a spare ROM socket in the adapter and Elkman has the facility to load ROMs off tape or disc into sideways RAM, would it be possible to buy a 16k dynamic RAM chip and plug it into the ROM adapter?

This chip only costs £1.15 – if it does work why is the 16k sideways RAM from Slogger so expensive? – **Simon Lack, Banbury, Oxon.**

● The simple answer is that you can't plug a RAM chip into your ROM adapter. Sideways RAM needs extra signals that ROMs don't and without them the RAM will not function.

So if you want to have sideways RAM you'll have to pay the extra money and get a special sideways RAM board which provides the additional signals.

Beach Head

I HAVE to agree with Steven Talbot's letter in the March edition of Micro Messages about Beach Head for the Electron.

The graphics are excellent and so is the sound – my highest score is 111,140.

If US Gold has converted this magnificent game for the Electron why can't more software houses do the same? – **David Erpinosa, Ruislip, Middlesex.**

LESSON FOR PILOTS

THIS is the first of a series of tips we are releasing for frustrated Harrier pilots who are unable to locate and destroy the enemy HQ.

To survive for any length of time you must look after your landing sites. The rules are simple, but easy to forget if you have three MiGs on your tail.

If a tank moves on to a landing site that site is destroyed – if using sound you will hear an explosion. A new landing site then becomes available at Home Base, where Q landing site starts off.

If a tank moves on to Home Base the game will end and you will get the red screen.

So if you hear explosions or get the red screen when everything seemed to be under control you have probably forgotten your landing site.

You are particularly vulnerable when a landing site is destroyed and you get a new one at Home Base, because tanks are targeted towards landing sites.

With a landing site on Home Base your Achilles Heel is exposed. Two tips.

● *As soon as you are airborne go and destroy the four tanks to the east of landing site Q.*

● *Move your landing sites every 15 minutes or so.* – **Mirrorsoft, Harrier Hot Line, 01-377 4837.**

Recorder cure

REGARDING Mr Elcoat's letter and the problems associated with the Acorn data recorder, it seems that the most common fault is the record slide jumping out of its guide, as is apparent by the record button being returned too high.

A small modification may be made to the recorder which limits the return of the slide, thus curing 90 per cent of the problem.

If the recorder is disassembled and the circuit board carefully removed the sprung lever which activates the record/play switch can be seen.

First remove the screw which retains this, and place a small solder tag underneath the lever.

Now replace the screw, put the record slide into its guide, and adjust the solder tag so that it is hard up against the brass pillar with all buttons at the same level.

Tighten up the screw, replace the circuit board and check the operation. Now box it up and you are back in business. – **R. Scott, Asitington, Northumberland.**

● Thanks for the solution to the fault. Remember, however, that this is likely to invalidate the warranty.

ADFS bugs

WHEN attempting to save a program to disc recently I had a Compaction Required prompt appear. I then carried out the COMPACT command using screen memory.

After three attempts I was able to save the program stored in the computer on to the disc in question.

But I have since discovered that several programs already on the disc have been corrupted.

Where did I go wrong? – **K.J. Arnold, Rustlington, Sussex.**

● The ADFS in the Plus 3 has a few bugs which you should be aware of.

Firstly, the cursor is not switched off when a disc is compacted.

Since the screen RAM is used as a temporary store for the disc contents it can be corrupted if the cursor flashes. Switch it off before compacting with:

```
VDU 23,1,0;0;0;0;
```

Also compacting discs with less than 8 or 9k free is likely to badly corrupt them.

WHAT would you like to see in future issues of Electron User?

What tips have you picked up that could help other readers?

Here is your opportunity to share your experiences.

Remember that these are the pages that you write yourselves. So tear yourself away from your Electron keyboard and drop us a line. And please, if you want a reply, enclose an SAE. The address is:

Micro Messages
Electron User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY.

Never before

... has there been such a helpful, easy-to-understand guide to BBC Basic

There has been an enthusiastic welcome from users of the Electron to "Getting Started on BBC Basic". And with good reason. For its author, Mike Bibby, is acknowledged to be one of Britain's leading experts on BBC Basic, and in it he achieves new standards in simplifying the teaching of Basic programming.

The book takes the reader step by step through the fundamentals of writing programs.

Its hands-on approach has been specifically designed to teach the absolute novice not only the formal rules of Basic but also that elusive quality – good programming style.

By working through its many examples, the reader will gain a clear insight into structured programming, and will quickly acquire the ability to use structured techniques in creating his own programs.

The chapters include:

- ★ Basic ideas – printing strings and numeric expressions
- ★ RUNning your first programs
- ★ Strings and simple editing
- ★ Getting data from your keyboard with INPUT
- ★ REPEAT ... UNTIL, the building blocks of loops
- ★ Controlling loops with FOR ... NEXT statements
- ★ Modes and colour
- ★ Introducing procedures – a taste of structured programming
- ★ How to use subscripted variables
- ★ Nested loops
- ★ Into the second dimension with arrays
- ★ String manipulation
- ★ Simple data structures

TO ORDER, PLEASE USE THE FORM ON PAGE 61

If you want to start doing more with your micro than just playing games, this package is your ideal introduction to the four most popular applications for professional computers. All the programs have been designed for simplicity, so even a child can use them. Yet they include advanced features not yet available on programs costing many times as much!

Finalist for the Home Software of the Year Award

Contains 32 page booklet giving clear, easy-to-follow instructions on all 4 programs

Word Processor: Ideal for writing letters and reports. There is a constant display of both time and word count, plus a words-per-minute display to encourage the budding typist! A unique feature is the double-size text option in both edit and printer mode – perfect for young children and people with poor vision.

Database: You use this for storing information, just like an office filing cabinet. Facts you have entered can be quickly retrieved by just keying in a word or part of a word. They can be sorted, replaced, saved for future use or printed out.

Spreadsheet: Enables you to use your micro for home accounts or pocket money records. It creates a display of numbers in rows and columns. Continuous updating is possible, and a changed figure can be instantly reflected throughout the rest of the spreadsheet. Your results can be saved, to be used for future updates, or can be fed into its associated program . .

Graphics: Part of the spreadsheet section, it lets you draw bar charts, pie charts and histograms to give a graphic presentation of your statistics. Helps to give life and colour to the dullest figures!

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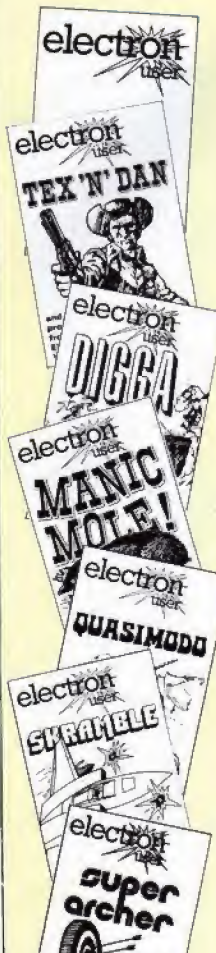

On the May 1986 tape:
MISSILE JAMMER Defend the city of Pasina from a missile invasion. **VECTOR LETTERS** Use *LINE to create double height text. **DEGREES** Convert from Centigrade to Fahrenheit and vice-versa. **CROCODILE TEARS** Spell well or end up as a crocodile's dinner. **ZAP** Blast the marauding aliens. **EXTRA COMMANDS** Adding new keywords to Basic.

On the April 1986 tape:
INVASION FORCE Exciting zap 'em space game. **EASTER EGG HUNT** Seasonal game using compass points. **BACH TO BASICS** Music tutor. **NOTICE BOARD** Text scrolling utility. **SEARCH and RECOVER** Two routines from the disc article. **NOTEBOOK** Recursion backwards.

On the March 1986 tape:
GRAND PRIX Exciting race game. **DICER** A clever test of strategy. **MARCHING ORDER** Counting and ordering numbers. **FIND AND REPLACE** Useful editing program. **SECTOR EDITOR** Excellent disc utility. **TIMEPIECE** Superb graphics demonstration. **OXO** Game of cunning. **TRICIRC** A circle of triangles.

On the February 1986 tape:
NECROMANCER Superb text adventure. **GREBIT** Arcade action. **FAST BACKUP** Disc utility. **MACHINE CODE** How to write an arcade game. **TAPEDISC** More software transferring techniques. **SIDEWAYS RAM** Example program.

On the January 1986 tape:
FRUIT WORM An arcade classic. **HELICOPTER RESCUE** Pilot an air sea rescue helicopter. **MACHINE CODE** Detect collisions between sprites. **TAPEDISC** Transfer your software to disc. **MODE012** Multi-Mode screens.

On the December 1985 tape:
GET SET SANTA Christmas fun collecting presents. **MISSILE ATTACK** Save your cities! **PROGRAM PROBE** Using joysticks. **SPACE COUNT** Counting for youngsters. **CHRISTMAS CARD** Cards and carols for all. **DISC MENU** Disc Menu creator.

On the November 1985 tape:
KARATE WARRIOR Electrifying combat. **ULA** Mode 6 Mode 7! **PAINT ROLLER** Colourful arcade action. **DEFUSE** Beware the bombs. **SPRITE PAINT** Machine code graphics utility. **TRAIN** Far from stationery graphics.

On the October 1985 tape:
DUNGEON QUEST An amazing all action arcade adventure. **PILOT** Computer assisted learning language. **RAVING ROLLER** Arcade action in the garden. **TRAIN** Animated action. **KALEIDOSCOPE** Colourful graphics action.

On the September 1985 tape:
TEXNDAN 3D Wild West shootout. **PINTCURSOR** Machine code graphics. **SPRITE/ED** Sprite editor. **COMPOSE** Writing music simplified. **REVERSI** Cunning strategy game. **SIMPLEFILE** Save and read data. **BOUNCE BALL** Two player action. **ROTATE** Animation in a spin.

On the August 1985 tape:
DIGGA Exciting arcade action beneath the earth. **DODGE THE ASTEROIDS** Fun deep in space among the asteroids. **M/CODE GRAPHICS** Sliding pints of beer! ***FX** The OS explored. **MOVEIT** An intriguing sliding puzzle. **HEXGRAM** An educational game to increase your word power.

On the July 1985 tape:
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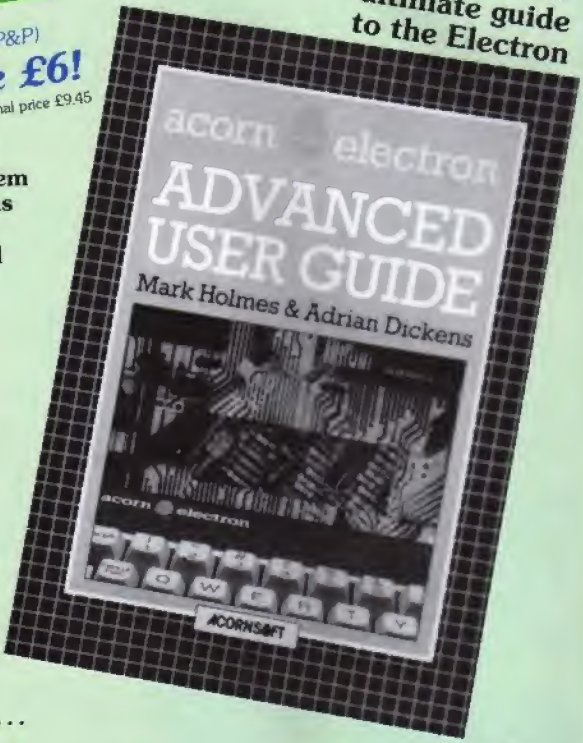

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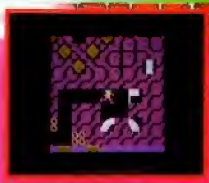

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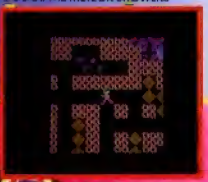

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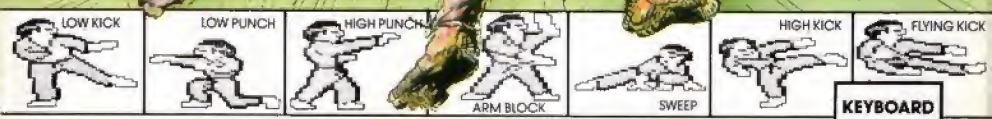

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